
Site-Specific Impacts. The following impacts are specific to particular well sites and their new road spurs. The same design features discussed above (i.e., SWPPP, Grading and Hydrology Plan, reclamation of disturbed areas, road repairs, surface water monitoring, and the SPCC Plan) would reduce impacts at each of these sites to a negligible level.

Leon Lake #4. Construction of the well pad and road could contribute negligible sediment to Surface Creek, which supports trout (including MIS Colorado cutthroat trout) and nongame fish species. The new road spur would be located within approximately 250 feet of Surface Creek. The use and transport of fuels and chemicals at this site could potentially result in a spill or leak that could affect aquatic communities in Surface Creek. The proposed pad is located approximately 1,300 feet from Surface Creek.

Leon Lake #5. Potential minor sedimentation effects and fuel or chemical spill risks on aquatic communities in Surface Creek would be lower than impacts discussed for Leon Lake #4. The basis for this conclusion is that the pad and new road spur would be located approximately 2,300 feet from Surface Creek. The closest stream segment to the proposed pad is an intermittent tributary to Cole Reservoir No. 5, which is located approximately 400 feet from the proposed pad.

Powerline. Construction of the well pad and new road spur at this site could contribute minor temporary, localized sediment to intermittent streams within East Fork Terror Creek and the Hubbard Creek drainage. Both Terror and Hubbard creeks support trout (including MIS Colorado River cutthroat trout) and nongame species. However, no fish populations occur in the closest intermittent streams to the pad or access road due to intermittent flows. Upgrade work on the WAPA maintenance road could contribute sediment to an unnamed tributary to Iron Point Gulch, which eventually drains into Hubbard Creek. The proposed pad would be located approximately 2,500 feet from an unnamed tributary to East Fork Terror Creek. The use and transport of fuels and chemicals at this site could potentially result in a spill or leak that could affect aquatic communities in both drainages. If a spill or leak occurred, impacts would depend on whether flowing water was present in the adjacent intermittent streams.

Bull Park. Construction of the well pad and new road spur at this site could contribute negligible sediment to West Fork Terror Creek. The beginning of the new road spur would be approximately 220 feet from an unnamed tributary to West Fork Terror Creek. The use and transport of fuels and chemicals at this site could potentially result in a spill or leak that could affect aquatic communities in this stream.

Hubbard Creek. Potential sediment impacts and chemical spills at this site would not likely affect the closest perennial stream (Lone Pine Creek), which is located approximately 1,600 feet from the proposed pad and new road spur. This tributary eventually drains into Hubbard Creek. A fuel or chemical spill could potentially affect aquatic communities in streams along the access route (Bear and Lone Pine creeks). However, the spill risk is expected to be extremely low.

Oakbrush. Potential negligible sediment impacts and chemical spills at this site would not likely affect the closest perennial stream (Lone Pine Creek), which is located approximately 1,300 feet from the proposed pad and new road spur. This tributary eventually drains into Hubbard Creek. A fuel or chemical spill could potentially affect aquatic communities in streams along the access route (Bear and Lone Pine creeks). However, the spill risk is expected to be extremely low.

Hawksnest and Thompson Creek. Potential negligible sediment or spill impacts at these sites would not affect aquatic communities, since no perennial streams are located within 3 miles of the pads. The closest perennial stream is the North Fork of the Gunnison River, which is 3.4 miles from the Hawksnest site and 3.9 miles from the Thompson Creek site.

No Action

Under the No Action Alternative, no surface disturbance would occur in the Surface, Terror, or Hubbard Creek drainages as a result of construction of new well pads and access roads. Current use of the roads within these drainages would continue, which could contribute sediment to perennial streams from vehicle use.

3.6.3 Cumulative Impacts

The principal past, present, and future actions with the potential for cumulative wildlife impacts include natural gas exploration and development, continued coal mining, timber sales, road and other construction, agriculture and range improvements, and wildfire.

Approximately 33.1 acres of wildlife habitat would be affected by surface disturbances with the Proposed Action. These effects would be relatively short-term, lasting up to a maximum of 3 years. If any of the wells prove to be economical for natural gas production, portions of the original disturbances would be lost as wildlife habitat for an estimated 20 to 30 years. These habitat losses would add to incremental habitat losses that have accrued from other gas drilling projects and a number of active coal mining operations within the analysis area. In addition, past and future planned timber harvest as well as range improvements on National Forest and BLM lands have converted forested and shrub habitats to more open grassland and grassland/shrub mixed habitats.

The greatest potential for cumulative impacts on wildlife and wildlife habitat would come with additional gas drilling activities and mining. Expansion of these activities could result in an increase in open roads as well as habitat conversion and loss associated with road and well site development. An increase in road access would result in a reduction in secure areas for big game species such as elk, mule deer, and black bear. Increased public access created by expanded road systems would increase public access, off-road vehicle (ORV) use, dispersed camping, and hunting and fishing access, all of which could have detrimental effects on analysis area wildlife populations, particularly game species. On the other hand, increased natural gas development activities could result in a perception of reduced quality for the hunting experience for hunters, thereby resulting in reduced hunter use and elk and deer harvest in the cumulative effects area. Reduced hunting pressure would be in conflict with CDOW management objectives as well as community and rancher interests in increased harvest of elk, especially cow elk. Habitat losses and increased road networks also have the potential for habitat fragmentation as well as disrupt existing secure wildlife movement corridors. Habitat fragmentation, conversion, and loss have the potential to adversely affect a number of forest sensitive species depending on the blocks of habitats affected. Geologic and gas production data are not available at this time to support additional development. Any proposal for production or additional well development would require documentation under subsequent NEPA analysis.

Human population increases in the region would create increases in human recreational activities, including hunting. Increased recreational use of public lands would place additional human disturbance pressures on wildlife populations as well as increase hunting pressure on big game populations. The actual magnitude of these effects on regional wildlife populations is impossible to predict, however.

Project-related truck traffic along existing access roads (primarily along SH 133 and SH 65) would result in a temporary incremental increase in noise effects for wildlife species. If the proposed exploration project overlaps temporally and spatially with other interrelated actions, the project also would result in a temporary incremental increase in noise effects for wildlife species in the vicinity of the well pad sites or their associated new access roads.

The potential cumulative impacts identified above generally would be applicable to the eight proposed exploratory gas well sites. Based on the information presented in **Table 2-9**, which describes the nature, location, and timing of these actions, the following activities could contribute to temporary cumulative wildlife impacts.

- Leon Lake #4 and #5 – Well abandonment at the Leon Lake #1 and recompletion at Leon Lake #2 and an approved exploratory well on private land (Spaulding Peak #1), as well as construction of water catchment reservoirs, ORV use of legal and illegal trails, and livestock grazing have and could continue to contribute to cumulative human activity and minor habitat loss impacts to wildlife. The proposed project also would contribute to an increase in the risk of wildlife/vehicle collisions in conjunction with activities requiring vehicle use of roads. The proposed project would result in a temporary incremental minor increase in these cumulative impacts for a maximum of a 3-year period. The time period would be shorter if the wells do not go through the testing phase and are reclaimed following completion.
- Powerline and Bull Park – Stevens Gulch road use and construction (for the Hubbard timber sale and access to the Stevens Gulch #1 well on private land), timber harvest, coal exploratory drilling for the Alder Creek Coal Exploration License, ORV use of legal and illegal trails, powerline ROW clearing, and livestock grazing have and could continue to contribute to cumulative human activity and minor habitat loss impacts to wildlife. The proposed project also would contribute to an increase in the risk of wildlife/vehicle collisions in conjunction with other activities requiring vehicle use of roads. The proposed project would result in a temporary incremental minor increase in these cumulative impacts for a maximum of a 3-year period. The time period would be shorter if the wells do not go through the testing phase and are reclaimed following completion.
- Hubbard Creek and Oakbrush – Permitted coal exploration; existing active coal mines (Bowie No. 2 and Sanborn) with additional road upgrades, exploratory drilling, ventilation pads, and active subsidence; coal exploratory drilling for the Alder Creek Coal Exploration License; an additional exploratory gas well on private land (Lone Pine #1), and livestock grazing have and could continue to contribute to cumulative human activity and minor habitat loss impacts to wildlife. The proposed project also would contribute to an increase in the risk of wildlife/vehicle collisions in conjunction with other activities requiring vehicle use of roads. The proposed project would result in a temporary incremental minor

increase in these cumulative impacts for a maximum of a 3-year period. The time period would be shorter if the wells do not go through the testing phase and are reclaimed following completion.

- Hawksnest and Thompson Creek – Permitted coal exploration, existing active coal mines (Sanborn and West Elk) with additional road upgrades and gas well drilling, ORV use of legal and illegal trails, and livestock grazing have and will continue to contribute to cumulative human activity and minor habitat loss impacts to wildlife. The proposed project also would contribute to an increase in the risk of wildlife/vehicle collisions in conjunction with other activities requiring vehicle use of roads. The proposed project would result in a temporary incremental minor increase in these cumulative impacts for a maximum of a 3-year period. The time period would be shorter if the wells do not go through the testing phase and are reclaimed following completion.

Relative to fisheries, cumulative actions related to gas development, coal mining, timber harvesting, grazing, and mining could result in short-term, localized increases in sediment from new disturbance areas within the Surface Creek, Terror Creek, and Hubbard Creek drainages. Based on information presented in **Table 2-9**, the following wells could contribute to temporary cumulative impacts to fish habitat as a result of localized increased sediment.

- Leon Lake #4 and #5 – Surface disturbance associated with the Leon Lake #2 and road use (FR 125, FR 127, and 127.1A) could result in minor, localized sediment into the Surface Creek drainage during the 3-year timeframe of the GEC project. The closes receiving waters would be intermittent streams.
- Bull Park and Powerline – Surface disturbance associated with timber harvesting (Terror Creek Green Oak Area, East Terror Sale, Stephen's Gulch Tree Removal, and Stephen's Gulch Area), timber hauling, oakbrush control, grazing, and vehicle traffic on unpaved portions of FR 701 could result in localized sediment in the Terror Creek drainage during the 3-year timeframe of the GEC project.
- Hubbard Creek and Oakbrush – Surface disturbance associated with grazing, gas development at the Lone Pine well site, coal mine exploration, and road use (new road spurs) could contribute localized sediment to the Hubbard Creek drainage during the 3-year timeframe of the GEC project.
- Hawksnest and Thompson Creek – Grazing, vehicle travel on Coal Gulch Jeep Trail Road, and coal mine exploration could contribute sediment to Hawksnest and Thompson creeks during the 3-year timeframe of the GEC project. However, no fisheries are present in these intermittent streams.

Erosion and sediment control measures would be required for these activities, which would minimize effects on aquatic species and their habitat. The extent of sedimentation impacts would depend upon the effectiveness of the sediment control practices, presence of drainages near the disturbance areas, distance to perennial streams, and flow conditions in the streams. Current and future use of unpaved, dirt roads within the Surface, Terror, and Hubbard Creek drainages also could contribute sediment and affect habitat for aquatic species.

The Proposed Action would not result in impacts on surface water quantity or quality due to well drilling, completion, or testing activities. Therefore, the proposed project would not add incremental impacts to other cumulative actions that affect surface flows or water quality in Surface, Terror, and Hubbard Creeks and the North Fork of the Gunnison River.

3.6.4 Potential Mitigation Measures

Additional protection measures for aquatic species and their habitat would be provided by implementing fuel restrictions, as discussed in Section 3.4.2, Water Resources, Mitigation Measure WR-1.

Potential impacts of the Proposed Action after implementing design features of the Proposed Action would be further reduced for wildlife species by applying the following additional mitigation:

FW-1: Since aspen snags, and especially large snags, provide potential nest sites for cavity nesting owls, woodpeckers and a number of songbirds, proposed development sites in aspen habitat would be surveyed for the presence of snags prior to construction. If any snags are located, the locations of surface disturbance would be modified to the extent necessary to avoid the loss of snags.

FW-2: No surface activities (beyond that which historically occurred in the area) would be permitted within a 0.25-mile radius of an active golden eagle nest site and associated alternate nests.

FW-3: No surface activities would be allowed within a 0.5-mile radius around each active golden eagle nest site from February 1 to July 15.

FW-4: No construction, drilling, completion, or testing activity would be permitted at the Leon Lake #4 and #5 and Powerline sites from May 15 to June 15 to protect elk calving activity.

FW-5: Drilling and completion activities at the Leon Lake #4 and #5 sites would not be scheduled at the same time in order to minimize the effects of motorized traffic on elk summer range.

3.7 Threatened, Endangered, and Sensitive Species

3.7.1 Affected Environment

3.7.1.1 Threatened, Endangered, and Sensitive Wildlife Species

Based on a review of current listings of threatened and endangered species for Gunnison and Delta counties as well as the Gunnison National Forests and a CNHP data search, a list of special status wildlife species was generated for the project study area (**Table 3.7-1**). Federal listed and candidate species considered in the analysis area were identified in correspondence from the USFWS (Appendix K). By comparing the ranges and habitat preferences of these species in relation to habitat conditions at the well sites and access roads, a list of species was identified for analysis in the EA.

No identified critical habitat for any state or federally listed threatened or endangered species has been identified within or near the analysis area. A number of threatened, endangered, and other species of concern (USFS and BLM sensitive) are potential inhabitants of the analysis area. **Table 3.7-1** summarizes the initial process used to determine which species would be addressed by this EA. All species with a low, moderate, or high probability of occurrence within the analysis area were carried forward in the EA analysis. Species with an occurrence probability of “none” were eliminated from further evaluation. Northern goshawk and American marten, which are listed as both USFS sensitive and MIS by the GMUG National Forests, are discussed in the preceding section on MIS. Northern goshawk also is listed as sensitive by the BLM.

Three federally listed, federal candidate, or state-listed species (bald eagle, boreal toad, and Canada lynx) were included in this analysis. The other federal or state-listed species were eliminated from further consideration, as described in **Table 3.7-1**. The following information provides background information on these USFS sensitive species.

Bald Eagle

Bald eagles reside primarily as wintering birds in Colorado, and wintering populations are known to inhabit the major river systems in the state. A few nesting records also exist for the state. Near the analysis area the bald eagle is only present as a winter resident along the North Fork Gunnison River drainage. This drainage and adjacent habitats are designated as a winter concentration area and winter range, respectively, by the CDOW. Suitable winter habitat for bald eagles consists of secure diurnal perches, winter nighttime roosts protected from severe weather conditions, and foraging areas usually associated with large lakes or rivers (USFWS 1983). Although preferred wintering areas are usually near open water where eagles feed on fish or waterfowl, bald eagles also will hunt over open, upland areas if other food sources (e.g., rabbits or deer carrion) are readily available (Green 1985). BLM inventory data from the early 1980s found bald eagles in many habitats including the Thousand Acre Flats area near the Thompson Creek and Hawksnest well sites. Non-forested portions of the analysis area represent potential, but not preferred, bald eagle winter foraging sites. As many as four to five bald eagles may be found along the North Fork of the Gunnison River near the analysis area during the winter months (Madariaga 1999). These wintering birds may occasionally wander over proposed well sites and access roads.

Table 3.7-1
Threatened, Endangered, Candidate, and Sensitive Wildlife,
Fish, and Invertebrate Species
Initial Screening Process for Potential Species Presence
in the EA Analysis Area

Common Name/ Scientific Name	Status ¹	Probability of Occurrence in Analysis Area	Potential Habitat in Analysis Area
Invertebrates			
Uncompahgre fritillary butterfly <i>Bolaria acrocnema</i>	E	None ²	None; found in alpine tundra, snow willow vegetation patches.
Regal fritillary butterfly <i>Speyeria idalia</i>	FS	None ²	None; tall-grass prairie and other open sites including damp meadows, wet fields, and mountain pastures; analysis area outside of known range.
Fish			
Colorado pikeminnow <i>Ptychocheilus lucius</i>	E, ST	None ²	None; potential effects from increased water withdrawal from upper Colorado River Basin are not anticipated.
Humpback chub <i>Gila cypha</i>	E, ST	None ²	None; potential effects from increased water withdrawal from upper Colorado River Basin are not anticipated.
Bonytail chub <i>Gila elegans</i>	E, SE	None ²	None; potential effects from increased water withdrawal from upper Colorado River Basin are not anticipated.
Razorback sucker <i>Xyrauchen texanus</i>	E, SE	None ²	None; potential effects from increased water withdrawal from upper Colorado River Basin are not anticipated.
Bluehead sucker <i>Catostomus discobolus</i>	BLM	None ²	None; potential effects on the North Fork of the Gunnison River and Hubbard Creek are not anticipated.
Flannelmouth sucker <i>Catostomus latipinnis</i>	BLM	None ²	None; potential effects on the North Fork of the Gunnison and Gunnison rivers are not anticipated.
Roundtail chub <i>Gila robusta</i>	BLM	None ²	None; potential effects on the North Fork of the Gunnison River are not anticipated.
Colorado River cutthroat trout <i>Oncorhynchus clarkipleuriticus</i>	FS, MIS	High	Conservation populations occur in upper mainstem Hubbard Creek and West Fork Terror Creek. The remaining portions of the Hubbard and Terror Creek drainages are managed under the Conservation Agreement. (CRCT Task Force 2001).

Table 3.7-1 (Continued)

Common Name/ Scientific Name	Status ¹	Probability of Occurrence in Analysis Area	Potential Habitat in Analysis Area
Amphibians			
Tiger salamander <i>Ambystoma tigrinum</i>	FS	Low	Lakes, streams, wetlands; potential habitat in wetlands near Bull Park, Oakbrush, and Powerline well sites.
Boreal toad <i>Bufo boreas boreas</i>	FS, C, EC	Low	Breeds in beaver ponds, lakes, and other surface water with shallow shoreline areas and lacking strong currents from 8,500 to 11,000 feet in elevation; wetlands near Bull Park, Oakbrush, and Powerline well sites may provide suitable breeding habitat.
Northern leopard frog <i>Rana pipiens</i>	FS, BLM	Moderate	Occurs in streams, lakes, and wetlands; potential habitat in wetlands near Bull Park and Powerline well sites.
Canyon treefrog <i>Hyla arenicolor</i>	BLM	None ²	None; intermittent streams in deep, rocky canyons at the lower elevations.
Reptiles			
Longnose leopard lizard <i>Gambelia wislizenii</i>	BLM	None ²	None; sparse, arid shrublands such as saltbush, greasewood, and rabbitbrush.
Milk snake <i>Lampropeltis triaulum</i>	FS	None ²	None; prairie, sandhills, shrublands, ponderosa pine, piñon-juniper.
Birds			
Common loon <i>Gavia immer</i>	FS	None ²	None; rare migrant in region but no suitable stopover habitat in analysis area.
American bittern <i>Botaurus lentiginosus</i>	FS	None ²	None; cattail marshes and adjacent wet meadows.
White-faced ibis <i>Plegadis chihi</i>	FS	None ²	None; migrant only in marshes, wet meadows, and reservoir shorelines.
Trumpeter swan <i>Cygnus buccinator</i>	FS	None ²	None; rare migrant in region but no suitable stopover habitat in analysis area.
Osprey <i>Pandion haliaetus</i>	FS	None ²	None; forested habitats along lakes and rivers.
Bald eagle <i>Haliaeetus leucocephalus</i>	T, MIS	Low	None; non-forested well pad sites represent potential, but not preferred, winter foraging areas.
Northern goshawk <i>Accipiter gentilis</i>	FS, MIS, BLM	Moderate	Mature Douglas-fir, spruce/fir, and aspen forest.
Ferruginous hawk <i>Buteo regalis</i>	FS, BLM	None ²	None; lower elevation grasslands and semi-desert shrublands.

Table 3.7-1 (Continued)

Common Name/ Scientific Name	Status ¹	Probability of Occurrence in Analysis Area	Potential Habitat in Analysis Area
Merlin <i>Falco columbarius</i>	FS	None ²	None; migrant in region but no suitable stopover habitats in analysis area.
Peregrine falcon <i>Falco peregrinus</i>	FS	Low	None; possible flyover; nests on high cliffs; forages over primarily riparian and aquatic habitats.
Gunnison sage grouse <i>Centrocercus minimus</i>	C, MIS, BLM	None ²	None; lower elevation sagebrush habitat.
Columbian sharp-tailed grouse <i>Tympanuchus phasianellus columbianus</i>	FS, BLM	None ²	None; species is known from the Uncompahgre Plateau in Mesa County, but no populations have been recorded in the vicinity of the analysis area.
Greater sandhill crane <i>Grus canadensis</i>	FS	None ²	None; migrant in region but no suitable stopover habitats in analysis area.
Whooping crane <i>Grus americana</i>	E, EC	None ²	None; no suitable stopover habitats in analysis area; no individuals remain in experimental non-essential population than once migrated through western Colorado.
Snowy plover <i>Charadrius alexandrinus</i>	T	None ²	None; rare migrant in region but no suitable stopover habitat in analysis area.
Long-billed curlew <i>Numenius americanus</i>	FS	None ²	None; rare migrant in region but no suitable stopover habitat in analysis area.
Black tern <i>Chlidonias niger</i>	FS	None ²	None; rare migrant in region but no suitable stopover habitat in analysis area.
Western yellow-billed cuckoo <i>Coccyzus americanus</i>	FS, C	None ²	None; lowland riparian forest and urban woodlands.
Burrowing owl <i>Athene cunicularia</i>	FS	None ²	None; prairie dog colonies at lower elevation grasslands and shrublands.
Boreal owl <i>Aegolius funereus</i>	FS	None ²	None; mature spruce-fir or spruce-fir lodgepole pine forests with meadows.
Mexican spotted owl <i>Strix occidentalis</i>	T	None ²	None; prefers pockets of Douglas-fir on steep canyon sideslopes.
Flammulated owl <i>Otus flammeolus</i>	FS	None ²	None; mature ponderosa pine/Douglas-fir forests.
Black swift <i>Cypseloides niger</i>	FS	None ²	None; cliffs near waterfalls.
Lewis' woodpecker <i>Melanerpes lewis</i>	FS	None ²	None; lowland and foothill cottonwood riparian forests; ponderosa pine woodland; urban and agricultural areas with tall deciduous trees.

Table 3.7-1 (Continued)

Common Name/ Scientific Name	Status ¹	Probability of Occurrence in Analysis Area	Potential Habitat in Analysis Area
Three-toed woodpecker <i>Picoides tridactylus</i>	FS	None ²	None; primarily spruce-fir forest but other coniferous forests are used when insect populations are high.
Southwestern willow flycatcher <i>Empidonax trailii extimus</i>	E	None ²	None; no suitable habitat in analysis area; found in large riparian complexes of dense shrub pockets with a tree overstory usually with nearby surface water and stream gradients of less than 4 percent. Analysis area outside of occupied range of this species.
Olive-sided flycatcher <i>Contopus borealis</i>	FS	Low	Occurs primarily in mature spruce-fir and Douglas-fir forest; less often in montane riparian woodlands and aspen.
Purple martin <i>Progne subis</i>	FS	Moderate to high	Mature aspen forest near open parks and water.
Pygmy nuthatch <i>Sitta pygmaea</i>	FS	Low	Occurs primarily in ponderosa pine forests but also may nest in aspen.
Golden-crowned kinglet <i>Regulus satrapa</i>	FS	None ²	None; breeds in mature spruce-fir forest.
Baird's sparrow <i>Ammodramus bairdii</i>	FS	None ²	None; migrant through eastern plains native grasslands.
Loggerhead shrike <i>Lanius ludovicianus</i>	FS	Low	Open shrublands and desert habitats usually at lower elevations than the analysis area.
Fox sparrow <i>Passerella iliaca</i>	FS	Low	Breeds in riparian willow shrublands and willow grown meadows.
Mammals			
Dwarf shrew <i>Sorex nanus</i>	FS	Unknown	Alpine rockslides to a variety of lower elevation habitats. Very little is known on life history and distribution in Colorado.
Spotted bat <i>Euderma maculatum</i>	FS, BLM	Low	Utilizes rock outcrops near streams; could forage near Hubbard, Terror, and Surface Creeks.
Townsend's big-eared bat <i>Corynorhinus townsendii</i>	FS, BLM	None ²	None; usually found in mine shafts, caves, and man-made structures.
Fringed myotis <i>Myotis thysanodes</i>	BLM	Low	Caves, mines, and shafts are used as hibernation and roost sites; may use oak brush habitat during feeding.
Yuma myotis <i>Myotis yumanensis</i>	BLM	None ²	None; piñon-juniper and riparian woodlands along streams at lower elevation; breeds in caves and attics.
Big free-tailed bat <i>Nyctinomops macrotis</i>	BLM	None ²	None; rock crevices in cliff faces; only five records in Colorado; no breeding in Colorado.

Table 3.7-1 (Continued)

Common Name/ Scientific Name	Status ¹	Probability of Occurrence in Analysis Area	Potential Habitat in Analysis Area
Ringtail <i>Bassariscus astutus</i>	FS	Low	Rocky canyonlands and rocky areas of piñon-juniper woodland and oak brush.
American marten <i>Martes americana</i>	FS, MIS	Low	Mature and mixed-age stands of spruce-fir and lodgepole pine.
Black-footed ferret <i>Mustela nigripes</i>	E	None ²	None; preferred habitat represented by prairie dog towns in lower elevation valleys.
Wolverine <i>Gulo gulo luscus</i>	FS, EC	Low	Likely extirpated in analysis area region; wide-ranging but prefers higher elevation conifer forests, mountain parks, subalpine and alpine habitats.
Canada lynx <i>Lynx lynx</i>	T	Low	Wide-ranging but prefers spruce-fir/lodgepole pine forests; the Bull Park, Oakbrush, Thompson Creek, Hawksnest, and Hubbard Creek well sites are not within a defined LAU; Leon Lakes #4 & #5 are within the Green Mt. LAU but in non-lynx habitat; the Powerline site is in the Crater Lake LAU but also in non-lynx habitat.

¹ Status:

E = Listed as Endangered by the USFWS under the ESA. Species that are in imminent jeopardy of extinction.

T = Listed as Threatened by the USFWS under the ESA. Species that are threatened with extinction.

C = Listed as Candidate by the USFWS. Taxa for which the Service has sufficient information to support listing as threatened or endangered.

EC = Listed by the CDOW as endangered in Colorado. A species in immediate jeopardy of becoming extinct throughout all or a significant portion of its range.

FS = Classified as "sensitive" by the Regional Forester when occurring on lands managed by the USFS. Draft listing of USFS species is based on Rocky Mountain Region, January 2003 GMUG National Forests (USFS 2003a).

MIS = Management Indicator Species for the GMUG.

BLM = Classified as "sensitive" by the State Director of the BLM in Information Bulletin No. CO-2000-014, dated April 14, 2000.

² None – Species was eliminated from further analysis.

Endangered Fish

Four federally listed fish species (Colorado pikeminnow, humpback chub, bonytail chub, and razorback sucker) occur in offsite areas including the Gunnison and Colorado rivers (USFWS 1994). Offsite areas inhabited by Colorado pikeminnow include the lower 30 to 40 miles of the Gunnison River and the Colorado River near Palisade, Colorado downstream to Lake Powell. The closest offsite areas inhabited by razorback sucker include Gunnison River (below Hartland Dam to the Colorado River confluence) and the Colorado River between Palisade, Colorado and Westwater Canyon. The occurrence of humpback chub is limited to one recent record in the lower Gunnison River and the Black Rocks and Westwater Canyon reaches of the Colorado River. The humpback chub has been collected in the Colorado River in the Black Rocks area, Cataract Canyon, and Lake Powell.

American Peregrine Falcon

The analysis area occurs within the nesting range of the American peregrine falcon. The peregrine's preferred nest site is a rugged, remote cliff (100 to 300 feet in height) usually overlooking water, marshy, or riparian areas where prey is abundant (USFWS 1984). Preferred hunting areas include cropland, meadows, river bottoms, marshes, and lakes that attract abundant bird life. However, peregrines are known to nest near Crawford, Colorado, and can travel up to 17 miles from nesting cliffs to hunting areas (USFWS 1984). There are no known peregrine falcon nest sites in or near the analysis area, and suitable nesting habitat is limited to a few cliff areas along lower Terror Creek and upper Hubbard Creek below its confluence with Willow Creek. However, peregrines are known to nest near Crawford, Colorado, and north and east of the analysis area on the Paonia District. Peregrines may occasionally wander over the analysis area while foraging or during migration. One observation of a peregrine falcon in flight traveling down the Bear Creek drainage toward the North Fork of the Gunnison River was recorded during June 2002 field surveys (BLM 2003a).

Boreal Toad

The boreal toad is managed under a conservation plan for the Southern Rocky Mountains (Loeffler 2001). The objectives of the management and conservation actions are to 1) prevent the extirpation of boreal toads from their historic range in the Southern Rocky Mountains; 2) recover the species to a level that would allow it to be de-listed in Colorado and New Mexico; and 3) avoid the need to list the species under the ESA. Strategies to protect habitat for boreal toad are defined in the conservation plan. In terms of constructing new roads, they should be designed to eliminate potential barriers to water flow and allow toad movements on either side of the road. Boreal toad occurs in the mountainous portions of Colorado and is most common between 8,500 and 11,000 feet in elevation (Hammerson 1999). They hide beneath rocks or logs or in rodent burrows when inactive. Toads emerge from hibernation in May to breed and return to hibernaculum in late August and September (Hammerson 1999). Preferred breeding habitats in Colorado include wet meadows, marshes, and the margins of beaver ponds and lakes (Hammerson 1999). Boreal toads breed in any body of water lacking a strong current and with gradually descending banks at some point around the perimeter (Loeffler 2001). Egg placement is usually in shallows where the thermal effects of the sun are optimized (Loeffler 2001). Available evidence indicated that females may disperse over greater distances and into drier habitats than the males (Loeffler 2001). Recent studies of toads by the CDOW indicate that

male toads remain within 300 meters of breeding sites, while females can move up to 3 to 4 miles from breeding areas (Loeffler 2001). Selected upland habitats for both males and females include aspen and conifer habitats with rocky areas or ground squirrel holes where toads seek refuge in rock crevices or rodent burrows to avoid temperature extremes and desiccation. Areas of wetlands and surface water within 500 feet of the Bull Park, Oakbrush, and Powerline well sites may provide suitable breeding habitat for boreal toads.

Lynx

The Canada lynx is most closely associated with spruce-fir and mixed aspen/conifer habitats in the southern Rocky Mountains. Other habitat types utilized include mixed conifer, aspen, willow riparian, and upland mountain shrub communities in proximity to the primary habitat types (Reudiger et al. 2000). Winter snow cover is an important aspect in reducing competition between lynx and other mammalian predators such as coyote and bobcat (Ruediger et al. 2000). The lynx's long legs and large feet permit this species to hunt in areas of deeper and softer snow than other potential competitors. Crusting or compaction of snow may reduce the competitive advantage that lynx have in soft snow (Buskirk et al. 2000a).

Lynx distribution in North America is closely tied with that of the snowshoe hare (McCord and Cardoza 1982). Snowshoe hares represent the principal prey of Canada lynx, comprising 35 to 97 percent of their diet throughout their range (Koehler and Aubry 1994). However, red squirrels also provide an important food source, especially during periods of low snowshoe hare population numbers (Apps 2000). During the summer, grouse and small mammal species also are taken, but snowshoe hares are typically still the Canada lynx's main prey item (Tumilson 1987). Snowshoe hares and red squirrels occur in a variety of forest types, and as a result, lynx habitat use is associated with a diversity of forest age and structural classes. Red squirrels inhabit mature, cone-producing forests, while the greatest numbers of snowshoe hares typically occur in younger seral stage forests.

Advanced successional stages of forests and dense conifer stands often are preferred denning habitats of Canada lynx, especially where areas of rock outcrop, large deadfall, or thickets are present (McCord and Cardoza 1982). The common component of natal den sites appears to be large woody debris, either down logs or root wads (Koehler 1990; Mowat et al. 2000; Squires and Laurion 2000). These den sites may be located within older regenerating stands or in mature conifer or mixed conifer-deciduous (typically spruce/fir or spruce/birch) forests (Koehler 1990).

Dry forest types (e.g., ponderosa pine and climax lodgepole pine) do not provide lynx habitat, and lynx habitat quality is believed to be lower in the southern periphery of its range, because landscapes are more heterogeneous in terms of topography, climate, and vegetation (Buskirk et al. 2000b). In the southern and drier portions of lynx range, hare habitat may be increasingly associated with more mesic, late-seral forests, and riparian areas (Buskirk et al. 2000b). Recent radio-tracking studies of Canada lynx released in southern Colorado indicate that Canada lynx spend considerable time foraging in riparian and willow bottom habitats along drainages (Patton 1999). These areas support a greater diversity of plant cover and structure as well as a higher density and diversity of potential prey species for Canada lynx.

The draft conservation strategy for the re-establishment of lynx in the southern Rocky Mountains indicates the re-establishment of viable Canada lynx populations in Colorado would require reintroductions (Seidel et al. 1998), and recent reintroduction efforts in Colorado have resulted in the release of 96 lynx in 1999 and 2000. More releases of lynx are planned. Most released lynx have remained in the core research area (New Mexico north to Gunnison, west as far as Taylor Mesa, and east to Monarch Pass).

Within and near the analysis area, preferred denning and foraging habitats are generally lacking. Mature spruce-fir and mixed aspen/conifer habitats (i.e., preferred denning habitats) and early seral stage stands (i.e., foraging habitat) are not supported within the analysis area. Forest successional stages in the analysis areas are currently dominated by oakbrush and immature and mature stands of aspen with few to no conifer (spruce-fir) components. Due to the lack of preferred denning and foraging habitats, use of the analysis area by lynx would be limited to occasional transitory animals.

The GMUG National Forests has mapped LAUs and potential habitat for the Canada lynx within the LAUs in accordance with the criteria specified in the Lynx Conservation and Strategy (Ruediger et al. 2000; USFS 2002b). The LAUs are mapped to include potential habitat within the approximate home range of a pair of lynx. LAU boundaries generally follow watershed boundaries so unsuitable habitat can be included within the LAU. The Leon Lake #4 and #5 well sites are within the Green Mountain LAU. The Powerline well site is within the Crater Lake LAU. Leon Lake #5 and Powerline well sites are located within aspen habitat; Leon Lake #4 is located within meadow/shrub habitat. All three well sites are mapped as non-lynx habitat according to the GMUG LAU Map (USFS 2002b). These well sites and associated access roads are not located in or adjacent to large blocks of spruce/fir or other communities that would provide denning or winter foraging habitat for lynx. The other five sites are not located within LAUs.

3.7.1.2 Other Special Status Animal Species

Potential habitat also exists in the study area for other species, which are considered USFS sensitive and/or BLM special concern species. Brief descriptions of their habitat use are provided below.

Colorado River Cutthroat Trout

Refer to Section 3.6 relative to this species.

Three BLM sensitive species (bluehead sucker, flannelmouth sucker, and roundtail chub) occur in offsite areas including lower Hubbard Creek, the North Fork of the Gunnison River, and the Gunnison River. The general occurrence of these species is provided in **Table 3.7-1**.

Northern Leopard Frog

Northern leopard frogs are a highly aquatic species and are usually found in close association with the banks and shallow water areas of permanent marshes, ponds, streams, lakes, and reservoirs. Water bodies with rooted aquatic vegetation are preferred (Hammerson 1999). Permanent aquatic habitats with emergent vegetation are essentially lacking within the analysis area, and the presence of northern leopard frog is

unlikely. Potential habitat near the well pads and access roads would be the same as listed for the boreal toad.

Northern Goshawk

Refer to Section 3.6 relative to this species.

Olive-sided Flycatcher

The olive-sided flycatcher is a neotropical migrant songbird that is widespread in open, mature stands of coniferous forest from the Rocky Mountains westward. In Colorado it inhabits spruce/fir forests at elevations from 9,000 to 10,000 feet (Terres 1980). It prefers forest edges near clearings, wooded streams, and lakes and is known to use burns and clearings, including clearcuts, for foraging. This species feeds on flying insects by darting out from high, exposed perch sites. Feeding and advertising behavior is characterized by conspicuous perching near the top of dominant trees or snags in the landscape. Snags or open branches are often used as perch sites, and populations are usually highest where snags are abundant (Ehrlich et al. 1988). This species breeds primarily in mature spruce/fir and Douglas-fir habitat and is not expected to be common within the analysis area.

Purple Martin

The purple martin is a common summer resident in the lower mountains of northeastern Mesa, northeastern Delta, and northwestern Gunnison counties (Andrews and Righter 1992). This species nests in tree cavities, and prefers old growth aspen, aspen/ponderosa pine, or aspen/Douglas-fir forests usually near parks, lakes, wetlands, or meadows. It breeds in loose colonies but defends individual nest sites (Holland 2000). Purple martins feed by hawking insects while flying over open areas and water. A nesting pair of purple martins was observed using an aspen tree cavity at the edge of a clear cut near FR 125 between the existing Leon Lake #1 and #2 well sites during the June 2002 field surveys (see Section 3.6.1.1). A design feature consisting of surveys for purple martin and other potential USFS and BLM sensitive species would be implemented. The surveys would identify species presence during the breeding period (mid-May through June) in areas of potential suitable habitat within 0.25 mile of proposed disturbance areas.

Pygmy Nuthatch

Pygmy nuthatches breed primarily in mature ponderosa pine woodlands, but also may occasionally use aspen, lodgepole pine, spruce-fir, and Douglas-fir forests for nesting (Andrews and Righter 1992). Like purple martin, pygmy nuthatch is a cavity nester. It feeds primarily by gleaning insects from tree bark but also consumes conifer seeds. Mature aspen stands in the analysis area represent potential nesting habitat, but the likelihood of pygmy nuthatch presence is limited because a lack of its preferred habitat, ponderosa pine forest. Breeding bird surveys completed for the two Leon Lake well sites and access roads did not record this species (see Section 3.6.1.1).

Loggerhead Shrike

Loggerhead shrike is a neotropical migrant that prefers open country, thinly wooded, or scrubby land with clearings (Terres 1980). Andrews and Righter (1992) report this species to be a fairly common summer resident in the western valleys of Colorado. Preferred habitats include open riparian areas, grasslands, shrublands, deserts, and open piñon-juniper woodlands. While Robbins et al. (1989, as cited in Andrews and Righter 1992) indicate that this species has shown significant population declines over most of North America, populations appear to be stable in western Colorado (Lambeth, personal communication, as cited in Andrews and Righter 1992). Loggerhead shrike may occur in open mountain shrub and oakbrush habitats within the analysis area, but this species generally prefers lower elevation, more arid habitats.

Fox Sparrow

The Rocky Mountain form of the fox sparrow is a summer resident of the mountains where it nests in riparian willow shrublands and wet, willow meadow associations (Andrews and Righter 1992). It prefers willow streams and beaver ponds supporting dense, shrubby undergrowth (Holland 2000). Willow wetlands along the drainages and within aspen stands represent potential breeding habitat for fox sparrow. Breeding bird surveys completed for the two Leon Lake well sites and access roads did not record this species (see Section 3.6.1.1).

Dwarf Shrew

Very little is known regarding the life history of the dwarf shrew. In Colorado, dwarf shrews have been collected at elevations above 5,500 feet in a variety of habitats including the edges of alpine and subalpine rockslides, spruce-fir bogs, coniferous forest, sedge marsh, brushy hillsides, and open woodland (Fitzgerald et al. 1994). Records of occurrence are sparse, but the wide diversity of habitats used by this species imply it is probably more widely distributed than records indicate (Fitzgerald et al. 1994). Dwarf shrew may occupy aspen and oakbrush habitats within the analysis area.

Spotted Bat

Spotted bats have been found at scattered locations (primarily in arid country) in the western U.S. (Barbour and Davis 1969). Habitat occupied by this bat ranges from low desert to montane coniferous forests normally below 8,000 feet in elevation (Watkins 1977). They have been found in a variety of habitat types including open ponderosa pine, desert scrub, piñon-juniper, and open pasture and hay fields. They roost alone in rock crevices high up on steep cliff faces. Cracks and crevices in limestone or sandstone cliffs provide important roosting sites (Leonard and Fenton 1983; Easterla 1973), especially where rocky cliffs are located in proximity to riparian areas (Findley et al. 1975). Rock outcrop areas along Hubbard and Terror creeks represent the most suitable habitat areas for spotted bat, but suitable habitat near proposed well sites and new access roads is lacking.

Fringed Myotis

The fringed myotis occurs as scattered populations at moderate elevations on the western slope of Colorado and has been found in association with ponderosa pine, piñon-juniper, and scrub oak habitats (CDOW 1984). It apparently is not common in Colorado, and has been only found at elevations up to 7,500 feet (Fitzgerald et al. 1994.). Caves, mines, and buildings are used as day and night roosts as well as hibernation sites. This species may occasionally forage over lower elevation oakbrush, but suitable roost and maternity sites are generally lacking within the analysis area and potential disturbance sites are higher than the known elevations occupied by this species.

Ringtail

Ringtails in Colorado are typically associated with rocky canyon country and foothill habitats of piñon-juniper woodland, mountain shrubland, and conifer-oakbrush. They are commonly found in close association with riparian woodlands as well (Fitzgerald et al. 1994). Their ecology is poorly understood, but they are known to be omnivorous vary their diet with food availability. Known denning sites include rock crevices, under large boulders, hollow logs and trees, and old buildings. Lower elevation oakbrush slopes within the analysis area may represent suitable habitat for the ringtail.

Wolverine

Wolverines are wide-ranging and occur in low densities in large roadless or isolated areas. Radio-tracking studies of wolverine in northwest Montana indicate that wolverines prefer rugged, relatively inaccessible mountainous areas at the high elevations in the summer and move to lower (but still snow-bound) elevations in the winter (Hornocker and Hash 1981). Wilderness or remote country where human activity is limited appears to be essential for the maintenance of viable wolverine populations. Wolverines are adapted for carrion feeding and will take their food from carcasses of large animals such as elk and deer in addition to killing smaller prey such as snowshoe hare, marmot, and rodents. The scavenging lifestyle of wolverines results in seasonally long movements and relatively large home ranges (Hornocker and Hash 1981). The wolverine is found in a wide variety of habitats including treeless tundra and forested areas. Occurrence of wolverine in various habitats is assumed to be associated with food availability (Banci 1994).

Historically wolverines inhabited the mountainous portions of Colorado, but their populations were apparently never high. Their current status in Colorado is uncertain. Unconfirmed reports of wolverine have been made at scattered locations in Colorado (Torres et al. 1978; CDOW Fisher, Lynx, and Wolverine Database records). After recent intensive inventory efforts in Colorado, "the CDOW has concluded that if any wolverine remain in Colorado their numbers are so small that they do not represent a viable population and are not detectable by known census methods" (Seidel et al. 1998). State and federal agencies are currently evaluating potential habitat areas and the possibility of re-establishment of wolverine populations in the southern Rocky Mountains. The draft conservation strategy prepared for this species indicates that the re-establishment of viable wolverine populations in Colorado would require reintroductions (Seidel et al. 1998). Although suitable habitat for wolverine exists in and around the analysis area, there is no evidence to suggest that wolverines occur in the region. The CDOW WRIS database and USFS file information do not list any sightings of wolverine or their sign in or near the analysis area.

3.7.1.3 Plant Species

Sixty-three rare plant species were reviewed for potential occurrence in the study area. These taxa are summarized in **Table 3.7-2** by name, protection classification, and potential to occur in the project area. Of the total, two are federally listed, 49 are classified as sensitive by the USFS and 13 are further classified as sensitive by the BLM.

Based on the site characterizations, no habitat is present in the affected area or its zone of influence for both of the federally listed plant species and the majority of sensitive plants. Five of the USFS sensitive plant species are associated with the habitats, elevational ranges, and geographic area of the Proposed Action and therefore have potential to be affected by exploratory drilling activities.

Based on site characteristics, no habitat is present in the affected area for either of the two federally listed plants. Based on vegetation communities, elevation range and geographic location, potential habitat is present in the affected area for 12 USFS sensitive plant species. The potentially affected sensitive plants are: Park milkvetch, Wetherill milkvetch, (4) moonwort fern species, yellow lady's slipper, Colorado tansy aster, Southern Rocky Mountain cinquefoil, meadow rue, king clover, and Gray's townsend daisy.

The area of Grand Mesa is known to have populations of monkshood (*Aconitum columbianum*) that exhibit unique characteristics in the flower. Some authorities have considered these populations to be their own species (*A. bakeri*) however; this is not widely accepted by authorities on the flora of Colorado (Weber and Wittman 1996). Monkshood grows in wet or moist habitats in montane environments such as are found in the project area. No wetland habitats are directly within the proposed well or road sites to be disturbed and therefore this species is not considered to be potentially affected by the Proposed Action.

3.7.2 Environmental Consequences

3.7.2.1 Proposed Action

Wildlife Species

Impacts Applicable to All Sites. The following sections provide analysis of potential effects of the Proposed Action on threatened, endangered, proposed, candidate, and BLM and USFS sensitive species.

Federally Listed Animal Species.

Colorado Pikeminnow, Razorback Sucker, Humpback Chub, and Bonytail Chub. No impacts would occur to federally endangered fish species in the Gunnison and Colorado rivers because project activities would not alter flows in tributaries to the North Fork of the Gunnison River. The basis for the conclusion is provided in Section 3.4.2.1. Water needed for the drilling operations would be obtained from the Oxbow Mine, which collects water under an existing water right and has completed consultation with the USFWS on water depletion from the Upper Colorado River Basin (USFWS 1996) (consultation letter in project file). Of the approved water volume (93.2 acre-feet), approximately 86.2 acre-feet per year is used by the Oxbow

Table 3.7-2
Threatened, Endangered, Candidate, and Sensitive Plant Species
Initial Screening Process for Potential Species Presence
in the EA Analysis Area

Common Name/ Scientific Name	Status ¹	Probability of Occurrence in Analysis Area	Potential Habitat in Analysis Area
Federally Listed			
Clay-loving buckwheat <i>Eriogonum pelinophilum</i>	E, SE	None ²	None; grows in Mancos shale badlands in salt desert shrub communities at elevations ranging from 5,200 to 6,400 feet.
Uinta Basin hookless cactus <i>Sclerocactus glaucus</i>	T, ST	None ²	None; found in desert shrub communities at elevations ranging from 4,500 to 6,000 feet.
Sensitive Plants			
Aleutian maidenhair fern <i>Adiantum aleuticum</i>	FS	None ²	None; known only in rich spruce forests in the San Juan Mountains.
Southern maiden-hair fern <i>Adiantum capillus-veneris</i>	FS	None ²	None; occurs on wet cliffs, seeps and springs between 4,800 and 7,800 feet.
Alpine aster <i>Aster alpinus</i> var. <i>vierhapperi</i>	FS	None ²	None; occurs only in alpine tundra habitats.
Park milkvetch <i>Astragalus leptaleus</i>	FS	Moderate	Moderate; known to occur in wet meadows and aspen communities in the Gunnison Basin.
Wetherill milkvetch <i>Astragalus wetherillii</i>	FS	Moderate	Moderate; occurs in sagebrush and piñon-juniper woodlands between 5,250 and 7,400 feet.
Moonwort ferns <i>Botrychium hesperium</i> <i>B. lineare</i> , <i>B. multifidum</i> , <i>B. pinnatum</i> , and <i>B. simplex</i>	FS	Moderate	Moderate; Occurs in mountain meadows, 7,900 to 9,500 feet. <i>B. simplex</i> is known only in Rocky Mountain National park which is outside of the project area.
Northern rockcress <i>Braya glabella</i>	FS	None ²	None; found growing above 12,000 feet elevation.
Mariposa lily <i>Calochortus flexuosus</i>	FS	None ²	None; endemic to desert flats in the four corners region.
Sedges <i>Carex leptalea</i> , <i>C. limosa</i> , <i>C. magellanica</i> var. <i>irrigua</i> , and <i>C. microglochin</i>	FS	None ²	None; all four species grow in subalpine wetlands.
Rocky Mountain thistle <i>Cirsium perplexans</i>	FS, BLM	None ²	None; endemic to adobe soils on barren gray shale in the Gunnison River valley below 7,000 feet.
Yellow lady's slipper <i>Cypripedium parviflorum</i>	FS	Low	Low; found in moist woods and meadows between 7,400 and 8,500 feet. Vulnerable to the effects of grazing.
Mountain bladder fern <i>Cystopteris montana</i>	FS	None ²	None; occurs in moist, rich spruce-fir forests above 9,000 feet.
Whitlow grass <i>Draba exungiculata</i> , <i>D. grayana</i>	FS	None ²	None; occurs in rocky alpine tundra habitats above 11,500 feet.

Table 3.7-2 (Continued)

Common Name/ Scientific Name	Status ¹	Probability of Occurrence in Analysis Area	Potential Habitat in Analysis Area
Roundleaf subdew <i>Drosera rotundifolia</i>	FS	None ²	None; occurs in acid peat fens above 9,000 feet.
Helleborine <i>Epipactis gigantea</i>	FS	None ²	None; Moist meadows, springs and seeps between 4,800 and 8,000 feet.
Wooly fleabane <i>Erigeron lanatus</i>	FS	None ²	None; found only in alpine habitat above 12,500 feet.
Cottongrass <i>Eriophorum altaicum</i> var. <i>neogaeum</i> , <i>E. chamissionis</i> , and <i>E. gracile</i>	FS	None ²	None; all three species are associated with wet meadows and ponds, above 8,000 feet.
King's campion <i>Silene kingii</i>	FS	None ²	None; occurs only in alpine tundra habitats.
Stoncrop gilia <i>Gilia sedifolia</i>	FS	None ²	None; found only in the San Juan Mountains in alpine tundra.
Vasey's rush <i>Juncus vaseyi</i>	FS	None ²	None; associated with wetland habitats found on slopes of Grand Mesa.
Bog sedge, Island purslane <i>Kobresia simpliciuscula</i> and <i>Koenigia islandica</i>	FS	None ²	None; both species occur in moist, alpine meadows.
<i>Leptodactylon watsonii</i>	FS	None ²	None; found only on granite cliffs near Glenwood Canyon.
Piceance bladderpod <i>Lesquerella parvula</i>	FS	None ²	None; grows in alpine tundra habitats.
Northern twayblade <i>Listera borealis</i> , and <i>L. convallarioides</i>	FS	None ²	None; moist subalpine forests and ravines above 8,700 feet.
Colorado tansy-aster <i>Machaeranthera</i> <i>coloradoensis</i>	FS	Moderate	Moderate; found in mountain meadows between 8,500 and 12,500 feet.
Grass of parnassus <i>Parnassia kotzebue</i>	FS	None ²	None; known only from rocky alpine habitats above 10,000 feet.
Debeque phacelia <i>Phacelia scopulina</i> var. <i>submutica</i>	FS	None ²	None; occurs at lower elevations between 4,700 and 6,200 feet.
<i>Phippsia algida</i> and <i>Physaria alpinum</i>	FS	None ²	None; both species grow in alpine tundra habitat above 11,000 feet.
Southern Rocky Mountain cinquefoil <i>Potentilla ambigens</i>	FS	Low	Low; associated with montane valley bottoms.
Willows <i>Salix candida</i> , <i>S. calcicola</i> , and <i>S. serrissima</i>	FS	None ²	None; all three willow species are restricted to wetland habitats.
Meadow rue <i>Thalictrum heliophilum</i>	FS	Low	Low; occurs in mountain meadows between 6,300 and 8,800 feet.
Gray's townsend daisy <i>Townsendia glabella</i>	FS	Moderate	Moderate; endemic to steep slopes on shale.

Table 3.7-2 (Continued)

Common Name/ Scientific Name	Status ¹	Probability of Occurrence in Analysis Area	Potential Habitat in Analysis Area
King clover <i>Trifolium kingii</i>	FS	Low	Low; known to occur in mountain meadows, streambanks, and moist habitats, especially in loamy sand and wet spruce forests.
Lesser bladderwort <i>Utricularia minor</i>	FS	None ²	None; occurs as an obligate wetland species in subalpine habitats.
Grand Junction milkvetch <i>Astragalus linifolius</i>	BLM	None ²	None; known only from sagebrush and piñon-juniper communities below 6,200 feet.
Naturita milkvetch <i>Astragalus naturitensis</i>	BLM	None ²	None; found on sandstone in piñon-juniper woodlands below 7,000 feet west of Grand Mesa.
San Rafael milkvetch <i>Astragalus rafaensis</i>	BLM	None ²	None; known to occur in gullied hills, washes, and near talus slopes in seleniferous, clay, or sandy soils between 4,400 and 6,500 feet.
Sandstone milkvetch <i>Astragalus sesquiflorus</i>	BLM	None ²	None; occurs on sandstone, talus slopes and sandy washes below 5,500 feet.
Kachina daisy <i>Erigeron kachinensis</i>	BLM	None ²	None; associated with saline soils in alcoves and seeps in canyon walls between 4,800 and 5,600 feet.
Montrose bladderpod <i>Lesquerella vicina</i>	BLM	None ²	None; endemic to sandstone over Mancos shale within piñon-juniper woodlands below 7,500 feet in the Montrose area.
Colorado desert parsley <i>Lomatium concinnum</i>	BLM	None ²	None; endemic to adobe hills derived from Mancos shale below 7,000 feet.
Payson lupine <i>Lupinus crassus</i>	BLM	None ²	None; found within piñon-juniper woodlands below 5,800 feet.
Dolores skeleton plant <i>Lygodesmia doloresensis</i>	BLM	None ²	None; known only from red alluvium in piñon-juniper woodland and grasslands below 5,000 feet.
Eastwood monkeyflower <i>Mimulus eastwoodiae</i>	BLM	None ²	None; occurs in moist habitats such as seeps and springs below 5,800 feet.
Paradox breadroot <i>Pediomelum aromaticum</i>	BLM	None ²	None; endemic to red clay and rock outcrops below 5,000 feet.
Little penstemon <i>Penstemon brevicaulis</i>	BLM	None ²	None; known to occur in sagebrush, piñon-juniper and desert grassland habitats below 5,000 feet.

¹Status:

- E = Listed as Endangered by the USFWS under the ESA. Species that are in imminent jeopardy of extinction.
- T = Listed as Threatened by the USFWS under the ESA. Species that are threatened with extinction in the foreseeable future.
- FS = Classified as "sensitive" by the Regional Forester when occurring on lands managed by the USFS. Listing of USFS species is based on Rocky Mountain Region Proposed Sensitive Plant List (January 2003) for GMUG National Forests.
- BLM = Classified as "sensitive" by the State Director of the BLM in Information Bulletin No. CO-2000-014, dated April 14, 2000.

²None – Species was eliminated from further analysis.

Sources: Austin 2003; Colorado Native Plant Society 1997; Natural Resources Conservation Service 2002; Reveal 2003; Spackman et al. 1997; Weber and Wittman 1996.

Mine. Assuming a maximum use of 5.4 acre-feet per year by GEC, sufficient water is available under Oxbow's consultation to cover GEC's water use. In addition, the BLM has completed a blanket consultation with the USFWS for oil and gas drilling activities in the Upper Colorado River Basin. This concurrence is based on the fact that oil and gas activities contribute more non-tributary water to the river system than deplete from it (letter in project file).

Bald Eagle. Wintering bald eagles in the region may occasionally hunt for big game carrion during the winter in areas near the Hawksnest and Thompson Creek sites. Well site and access road locations are not within or near any areas of suitable summer nesting habitat. There would be no indirect water quality or quantity impacts along any portions of the North Fork Gunnison River where wintering bald eagles congregate.

Canada Lynx. Only three proposed well sites (Leon Lake #4 and #5 and Powerline) are within a LAU as discussed below under Site-specific Impacts. The other proposed well sites are outside of any designated LAUs. Lynx habitat mapping criteria (version 2.0) for the LAUs are on file with the GMUG National Forests. Although none of the proposed well sites or access roads would be within any areas designated as lynx habitat, approximately 10 acres of aspen habitat would be directly impacted by the Proposed Action. During the mapping of potential lynx habitat on the GMUG, aspen stands that were beyond 500 meters from suitable denning or winter foraging habitat were considered non-habitat for lynx. Based on the lynx conservation strategy (Ruediger et al. 2000), there is a possibility that lynx make some use of such aspen sites. However, there are 55,939 acres of aspen and aspen/oakbrush mix in the North Fork of the Gunnison River watershed and 21,449 acres of aspen in the lower Gunnison River watershed (Colorado Vegetation Classification Project 2001), which means the proposed action would directly impact 0.01 percent of the aspen stands in those watersheds. The effects of this impact on areas designated as non-lynx habitat, but could possibly be used by lynx, would not be detectable and would have no effect on lynx.

One of the principal factors affecting lynx habitat in Colorado may be increased human presence and human alteration or reduction of existing remote habitat areas. Human population growth and expansion of recreational activities into remote mountainous areas has contributed to the creation of migration barriers, fragmentation of habitat, and reduction in areas of solitude and refugia (Ruediger et al. 2000). The effects of increased human presence and roads also may reduce habitat effectiveness. Roads fragment habitat and increase the probability of mortalities from vehicle collisions (Ruediger et al. 2000). Human presence and alteration of habitat also may affect potential dispersal corridors thereby isolating populations and increasing the susceptibility of lynx to the extinction process (Ruediger et al. 2000).

One additional issue related to increased human presence is the potential for additional access opportunities for predators such as coyote, bobcat, and red fox into winter areas that could formerly be accessed only by lynx. Lynx are adapted for travel in deep snow conditions. Its large feet (for its size) permit travel over deep, soft snow conditions that would normally restrict coyote, bobcat, and red fox movement. In areas where winter recreation activities such as snowshoeing, cross-country skiing, and snowmobiling occur, these activities can create snow-packed trails and areas that permit predators such as red fox, bobcat, and coyote access to snow-bound sites that could normally only be traversed by lynx. Increased competition from red fox, bobcat, and coyote could reduce prey availability for lynx thereby reducing winter

habitat effectiveness. Two goals of the conservation strategy for lynx (Ruediger et al. 2000) apply to the Proposed Action. They are: 1) no net increase in over-the-snow routes within a LAU, and 2) maintenance of at least 70 percent of the LAU in suitable habitat condition for lynx.

Sensitive Animal Species.

Bluehead Sucker, Flannelmouth Sucker, and Roundtail Chub. No impacts would occur on these fish species because project activities would not alter flows in the North Fork of the Gunnison or Gunnison rivers. The basis for this conclusion is discussed for the federally endangered fish species.

Tiger Salamander, Boreal Toad, and Northern Leopard Frog. Project-committed design features would preclude any development or direct disturbance in wetlands or aquatic habitats that could provide potential breeding habitat for tiger salamander, boreal toad, and northern leopard frog. The proposed Oakbrush access road would cross an intermittent stream channel. However, installation of a culvert would maintain flow within the channel, and implementation of BMPs during road construction would prevent sedimentation impacts to the channel and downstream wetland and aquatic resources. BMPs to be employed by the Proposed Action as well as the implementation of an Erosion Control and Water Quality Monitoring Plan and a SPCC Plan would preclude any indirect impacts to potential breeding habitats for these amphibian species.

American Peregrine Falcon. Peregrines may occasionally wander over the analysis area while foraging or during migration. However, none of the proposed well sites or access roads would be constructed near preferred foraging areas or suitable nesting habitat. The Proposed Action would have no adverse effects on peregrine falcon.

Olive-sided Flycatcher. This species breeds primarily in mature spruce/fir and Douglas-fir habitat and is not expected to be common within the analysis area. Well site and access road development in wooded aspen habitat would create small or long, narrow openings through forested habitat thereby increasing forest edge and enhancing habitat for olive-sided flycatcher. Where possible, development activities should avoid the removal of larger snags that could provide suitable perch sites for olive-sided flycatcher.

Purple Martin. Cavities in larger aspen trees near shrub or meadow openings represent potential breeding sites for purple martin. Stands of mature aspen could be directly or indirectly affected by project development at the Leon Lake #4, Leon Lake #5, Oakbrush, Hubbard Creek, and Powerline well pad sites. Direct removal of mature aspen trees at the Oakbrush and Hubbard Creek sites or noise from construction, drilling, completion, and testing activities during the nesting season at the Leon Lake #4, Leon Lake #5, Oakbrush, Hubbard Creek, and Powerline sites could have an impact on breeding pairs of purple martin, if they nested within 0.25 mile of development.

In order to preclude any potential disturbance to nesting purple martins, it is recommended that, in areas where the Proposed Action would affect mature aspen stands, purple martin nesting surveys be performed prior construction to identify purple martin activity with 0.25 mile of development activities. If any nest sites are located, then well or access road development plans should be modified so that nest sites are not adversely affected or development timing be constrained to preclude impacts during the breeding season.

Pygmy Nuthatch. Mature aspen stands in the analysis area represent potential nesting habitat, but the likelihood of pygmy nuthatch presence is limited because of a lack of its preferred habitat, ponderosa pine forest. Cavities in aspen trees represent potential breeding sites for pygmy nuthatch, and where possible, project development would avoid the removal of snags that could provide nesting habitat.

Loggerhead Shrike. There could be losses of potential habitat areas used by loggerhead shrike (Oakbrush) with development of the Thompson Creek and Hawksnest well sites, but these losses would be relatively minor. Individual birds could be affected by these losses, but minor habitat reductions would not result in a loss of population viability for loggerhead shrike.

Fox Sparrow. Proposed Action mitigation measures would preclude any development in or disturbance of riparian, streamside, and wetland habitats preferred for nesting by summer resident fox sparrows. Therefore, the Proposed Action would have no adverse impact on fox sparrow or its preferred habitat.

Dwarf Shrew. Dwarf shrew may occupy aspen and oakbrush habitats within the analysis area, but the potential for its presence is unknown. Minor reductions in these habitats would not result in a loss of population viability for dwarf shrew.

Spotted Bat and Fringed Myotis. There would be no disturbance of important habitats for spotted bat and fringed myotis. Caves, old mines, and areas of rock outcrop suitable for roost, hibernation, or maternity sites for these species would not be affected by the Proposed Action. The Proposed Action would not result in a loss of population viability for these species.

Ringtail. The Proposed Action would not impact any potential den sites for ringtail. The Thompson Creek and Hawksnest well sites could result in minor reductions in foraging habitat for ringtail. A reduction in available foraging habitat may affect individual ringtails but is unlikely to result in a loss of population viability for this species.

Wolverine. One of the principal factors affecting potential wolverine habitat in Colorado may be increased human presence and human alteration or reduction of existing remote habitat areas. Human population growth and expansion of recreational activities into remote mountainous areas has contributed to the creation of migration barriers, fragmentation of habitat, and reduction in areas of solitude and refugia (Seidel et al. 1998). Human presence and alteration of habitat also may affect potential dispersal corridors thereby isolating populations and increasing the susceptibility of wolverines to the extinction process (Seidel et al. 1998). Wolverines also require secluded natal denning habitat, and human activity around den sites has led to abandonment. Winter recreational activities such as snowmobiling and back-country skiing may displace wolverines from potential denning habitat or cause den abandonment (Copeland and Hudak 1995).

The analysis area may support part of an individual wolverine's larger home range or serve as a movement corridor for the species. However the relatively minor reductions in habitat and creation of new access roads

would not occur in any relatively remote or secure areas representing preferred wolverine habitat. Therefore, the Proposed Action is unlikely to result in a loss of population viability of the wolverine.

Site-specific Impacts. The following impacts are specific to particular well sites or their associated new road spurs.

Leon Lake #4 and #5. There would be no direct impacts to mature aspen habitat at these well sites; however, indirect impacts to nesting purple martin could occur if exploration activities occur during the breeding season and nesting pairs are present within 0.25 mile of disturbance sites. The Leon Lake #4 and #5 sites are within the Green Mountain LAU. However, both are within non-lynx habitat as mapped by the GMUG LAU Map. The Green Mountain LAU contains 17,703 acres of suitable lynx habitat of which 12,117 acres are denning habitat, 396 acres are winter foraging habitat, and 5,190 acres are other lynx habitat (habitat capable of becoming but currently not suitable denning or winter foraging habitat). There are no acres of currently unsuitable lynx habitat in this LAU. There would be no alteration of suitable lynx habitat, therefore 100 percent of suitable lynx habitat would be maintained in this LAU. Leon Lake #4 and #5 sites would require the construction of 2,040 feet of new access roads. These road segments would not result in a movement barrier or fragmentation of lynx habitat. Operation of the Leon Lake well sites during the winter months could result in a minor increase of snow-packed roads (2,040 feet) within the Green Mountain Lake LAU (FR 125 and FR 127 are open to winter snowmobile use). However, increased trail access into snowbound areas would impact habitat effectiveness for lynx only if these trails permit carnivore travel into preferred or high quality foraging areas for lynx (Patton 1999). The Leon Lake sites' access roads would not be created within any designated areas of lynx habitat. The new access roads also would not connect to any areas of designated lynx habitat. Therefore, development of these access roads would not have an effect on lynx or lynx habitat.

Potential impacts to other listed TES species would be the same as that described in the general impact discussion for all well sites.

Bull Park. No impacts to listed TES species are anticipated at this site as long as design features of the Proposed Action and recommended mitigation measures are implemented.

Powerline. There would be no direct impacts to mature aspen habitat at this well site; however, indirect impacts to nesting purple martin could occur if exploration activities occur during the breeding season and nesting pairs are present within 0.25 mile of disturbance sites. Potential wetland breeding habitat for boreal toad, tiger salamander, and northern leopard frog exists within 500 feet of the well site. Design features of the Proposed Action and mitigation measures would preclude any direct or indirect impact to sensitive amphibian species breeding habitat. The Powerline site is within the Crater Lake LAU and is mapped as non-lynx habitat according to the GMUG LAU Map. However, the site is within approximately 300 feet of an area designated as other lynx habitat to the east. The Crater Lake LAU contains 24,946 acres of suitable lynx habitat. Of this total, 13,072 acres are mapped as lynx denning habitat, 7,512 acres are mapped as winter foraging habitat, and 4,362 acres are mapped as other lynx habitat acres. There are no acres of currently unsuitable lynx habitat in this LAU. There would be no alteration of lynx habitat; therefore, 100 percent of suitable lynx habitat would be maintained in the LAU. The site would require the construction of a 75-foot-long new access road. This short road segment would be constructed between two existing

access roads and would not result in a movement barrier or fragmentation of lynx habitat. Operation of the well site during the winter months could result in a minor increase of snow-packed roads (75 feet) within the Crater Lake LAU (most of the access road from the Stevens Gulch Road to the Powerline site is open to snowmobile use during the winter months). However, increased trail access into snowbound areas would impact habitat effectiveness for lynx only if these trails permit carnivore travel into preferred or high quality foraging areas for lynx (Patton 1999). The Powerline well site and access road would not be created within any designated areas of lynx habitat. The 75 feet of new access road also would not connect to any areas of designated lynx habitat. Therefore, development of this site would have no effect on lynx or lynx habitat.

Potential impacts to other listed TES species would be the same as that described in the general impact discussion for all well sites.

Oakbrush and Hubbard Creek. Potential purple martin nesting habitat exists at or near the well sites and along portions of the access roads. Well site and access road construction during the songbird breeding season could result in adverse effects on individual nesting pairs of purple martin and the unintentional loss of individual nest sites if activities occur during the nesting season. Potential wetland breeding habitat for boreal toad, tiger salamander, and northern leopard frog exists within 500 feet of the Oakbrush well site. Design features of the Proposed Action and mitigation measures would preclude any direct or indirect impact to sensitive amphibian species breeding habitat.

Potential impacts to other listed TES species would be the same as that described in the general impact discussion for all well sites.

Hawksnest and Thompson Creek. Oakbrush habitat at this site may represent potential breeding habitat for loggerhead shrike, although this species generally prefers lower elevation, more open shrub habitats for breeding. Minor losses of oakbrush habitat (approximately 10 acres) would not result in a loss of population viability for loggerhead shrike.

Potential impacts to other listed TES species would be the same as that described in the general impact discussion for all well sites.

Plant Species

Impacts Applicable to All Sites. No effects are anticipated to occur to the two federally listed plants listed in **Table 3.7.2** because they occur in habitats that are not present within the project area. Similarly, no effects are anticipated to occur to 47 USFS and BLM sensitive species listed in **Table 3.7-2** because no habitat is present for these species in the affected area. These species are associated with alpine tundra above 10,000 feet, wetland habitats, and unique geologic formations, none of which are in the affected area.

Nine USFS and 2 BLM sensitive plant species have potential to occur in the project area, predominantly within the mountain meadow and aspen vegetation types. Habitat potential for these 11 species is summarized in **Table 3.7-3** by proposed activity site.

Table 3.7-3
Potential Habitat for Sensitive Plants

Activity Area	Elevation (feet)	Vegetation Community	Species with Present Potential Habitat¹
Bull Park	8,580	Aspen	Park milkvetch
Hawksnest	8,200	Oakbrush, meadow mix, and piñon-juniper woodland	Moonwort species, yellow lady's slipper, Southern Rocky Mountain cinquefoil, meadow rue, Wetherill milkvetch, Gray's townsend daisy, and king clover
Hubbard Creek	7,800	Aspen and meadow	Park milkvetch, Southern Rocky Mountain cinquefoil, and king clover
Leon lake #4	8,980	Mountain meadow and mountain shrub	Park milkvetch, moonwort species, Colorado tansy-aster, Southern Rocky Mountain cinquefoil, meadow rue, and king clover
Leon Lake #5	8,760	Aspen	Park milkvetch
Oakbrush	8,120	Oakbrush and aspen types	None
Powerline	8,895	Aspen	Park milkvetch
Thompson Creek	8,200	Oakbrush and piñon-juniper woodland	Wetherill milkvetch and Gray's townsend daisy

¹ Scientific names are provided in **Table 3.7-2**.

Based on the limited extent of road construction and upgrading, no effects to wetland habitats are anticipated. Moreover, impacts to wetland habitats with potential for supporting rare plants in proximity to the proposed construction sites would be precluded by standard lease stipulations requiring wetland impacts to be avoided (see Section 3.5.2).

Site-specific Impacts. The probability of occurrence for the potentially affected plants ranges from low to moderate due to the extent and intensity of livestock grazing, especially sheep, at each of the sites. In the absence of surveys, it is assumed that these species are present and potentially could be impacted.

Ground disturbing activities may affect a total of approximately 11 acres of potential habitat for Park milkvetch at all of the proposed well sites, except Oakbrush and Thompson Creek (see **Table 3.7-3**). Ground blading would affect approximately 3.5 acres of potential habitat for several moonwort fern species, the native meadow rue, Rocky Mountain cinquefoil, and king clover at the Hawksnest and Leon Lake #4 sites. Construction of roads and well pads for Hawksnest and Leon Lake #4 also would affect 1.2 and 2.3 acres of potential habitat for yellow lady's slipper and Colorado tansy-aster, respectively. Roadwork such as widening at the lower end of the Coal Gulch Jeep Road would affect small pockets of potential habitat for Wetherill's milkvetch and Gray's townsend daisy.

3.7.2.2 No Action

Under the No Action alternative there would be no effects to TES species resulting from GEC's proposed activities. As a result, wildlife habitat distribution, extent, and condition as well as sensitive wildlife

populations would remain similar to existing conditions, assuming there are no major alterations in current land use activities.

3.7.3 Cumulative Impacts

The principal past, present, and foreseeable actions with the potential for cumulative impacts to TES species include natural gas exploration and development, continued coal exploration and mining, timber sales, road and other construction, agricultural and range improvements, and wildfire.

The analysis of cumulative wildlife impacts in Section 3.6.3 would apply to threatened, endangered, and sensitive species as well. Habitat fragmentation, conversion, and loss have the potential to adversely affect a number of USFS sensitive species depending on the habitats affected. Secure habitat areas for the wolverine could be adversely affected by increases in road densities associated with additional gas field development. However, it is not anticipated that the proposed project would add cumulatively to the impact for this species, as project activity would not occur in areas representing preferred wolverine habitat.

The potential cumulative effects identified above and in Section 3.6.3 for general wildlife generally would be applicable to the eight proposed exploratory gas well sites. Based on the information presented in **Table 2-9**, which describes the nature, location, and timing of these actions, the following wells could contribute to temporary cumulative impacts for TES wildlife species.

- Leon Lake #4 and #5 – Secure habitat areas for the lynx could be adversely affected by increases in road densities if additional gas drilling were to occur. It is not anticipated that the proposed project would add cumulatively to the impact for this species, as project activity would not occur within or connect to designated areas of lynx habitat. The permitted Spaulding Peak #1 exploration well is not within the Green Mountain LAU.

Assuming that past, present, and continued gas exploration activities (Spaulding Peak #1, Leon Lake #1 abandonment, and Leon Lake #2 recompletion) and wildfire have or would affect suitable breeding habitat for purple martin, and assuming project activities at the Leon Lake sites would occur during the breeding season, the project could result in a temporary (one breeding season) incremental increase in cumulative impacts for this species. However, the potential for the project to contribute cumulatively to the effects to breeding populations of purple martin is low, based on the minor amounts of mature aspen that would be directly or indirectly affected within 0.25 mile of development sites.

- Powerline and Bull Park – Secure habitat areas for the lynx could be adversely affected by increases in road densities if additional gas drilling were to occur within the Crater Lake LAU (applicable to the Powerline site). However, it is not anticipated that the proposed project would add cumulatively to the impact for this species, as project activity would not occur within or connect to designated areas of lynx habitat.

Assuming that past, present, and continued gas exploration (Stevens Gulch #1) and coal exploration and mining (Alder Creek and Iron Point coal exploration licenses), timber sales, and wildfire have or would affect suitable breeding habitat for purple martin, and assuming project activities at the Powerline

and Bull Park sites would occur during the breeding season, the project could result in a temporary (one breeding season) incremental increase in cumulative impacts for this species. However, the potential for the project to contribute cumulatively to the effects to breeding populations of purple martin is low, based on the minor amounts of mature aspen that would be directly or indirectly affected within 0.25 mile of development site.

- Hubbard Creek and Oakbrush – Assuming that past, present, and foreseeable natural gas exploration and development, continued coal exploration and mining, gas exploration (Lone Pine #1), timber sales, and wildfire have or would affect suitable breeding habitat for purple martin, and assuming project activities at the Oakbrush and Hubbard Creek sites would occur during the breeding season, the project could result in a temporary (one breeding season) incremental increase in cumulative impacts for this species. However, the potential for the project to contribute cumulatively to the effects to breeding populations of purple martin is low, based on the minor amounts of mature aspen that would be directly or indirectly affected within 0.25 mile of development sites.
- Hawksnest and Thompson Creek – Assuming that past, present, and foreseeable natural gas exploration and development, continued coal mining, timber sales, road and other construction, agricultural and range improvements, and wildfire have or would affect suitable breeding habitat for loggerhead shrike, and assuming exploration activities at these exploration well sites would occur during the breeding season, the project could result in a temporary (one breeding season) incremental increase in cumulative impacts for this species. However, the potential for the project to contribute cumulatively to the effects to breeding loggerhead shrike is low, based on the lack of preferred habitat within 0.25 mile of proposed development sites.

Present and future activities involving gas development, coal mining, recreation, new road development, timber harvesting, and livestock grazing could affect sensitive plant species in habitats listed in **Table 3.7-3**. Policies for management of sensitive plants by the USFS and BLM direct local land managers to avoid and minimize impacts that would affect species or population viabilities. Hence, few or no direct impacts to rare plant populations have been or would be anticipated in the recent past or foreseeable future on public lands in the project area. Based on the commitment to survey for rare plants prior to ground disturbance and to avoid or minimize the potential for impacts to occur at each site, no contributions to cumulative effects as a result of the proposed project are expected to BLM or USFS sensitive plant populations in the area.

Habitat for rare plants is indirectly undergoing alterations primarily due to livestock grazing and the advent of noxious weeds. Weed management (inventory, treatment, prevention, and monitoring) at the proposed well sites and access roads would be expected to minimize the potential contributing effects of noxious weeds in the general habitat for rare plants.

3.7.4 Potential Mitigation Measures

The following additional mitigation measure would be implemented to further reduce potential impacts to threatened, endangered, or sensitive species.

TE-1: In order to determine if impacts to sensitive plants would occur, pre-construction surveys would be conducted. Pre-construction surveys during the growing season would facilitate avoidance or mitigation measures to preclude or reduce the potential for impact. If sensitive plants were found to be present, GEC would coordinate with the USFS and BLM to determine the most effective means of mitigating or precluding impacts.

TE-2: Stream flow at access road crossings of intermittent creeks at the Oakbrush and other sites would be maintained with the use of culverts or other appropriate measures to protect potential downstream habitats for boreal toad.

3.8 Land Use and Recreation

The study area for the land use and recreation analysis includes all lands and recreational opportunities within a 5-mile radius of each well pad site. This study area applies to both the Proposed Action and cumulative effects areas.

3.8.1 Affected Environment

3.8.1.1 Land Use

The proposed project lies within the GMUG National Forests and on BLM land located north of the towns of Cedaredge, Paonia, and Somerset, within Delta and Gunnison counties. Dominant land uses within the region are mining, agriculture, grazing, logging, and recreation. This section describes the various land uses within and adjacent to the proposed drilling exploration project area. Additional information on past and present land uses are listed in **Table 2-9** and Appendix F.

Public Lands

The Proposed Action would occur on both USFS and BLM lands. As currently planned, total new disturbance for well pads and spur roads would be approximately 13.4 acres on USFS land and approximately 2.4 acres of BLM land. Maintenance on existing roads would occur on a combination of USFS, BLM, and private land. Surface ownership for the eight pad sites and associated access roads is shown in **Table 2-1**.

Oil and Gas

Refer to Section 3.3.1 for the history past oil and gas drilling exploration in the project area. Details on existing leases are presented in Section 2.1.2.12.

Past and Present Mining Operations

Underground coal mining has been one of the dominant land uses in the North Fork of the Gunnison River area for the past 100 years. Coal mining has occurred on both private and public lands in the general area. There are currently three active mines (Elk Creek, West Elk, and Bowie No. 2), one idle underground coal mine in the North Fork Valley (Bowie No. 1), and one in the process of being closed (Sanborn Creek).

- Elk Creek Mine is operated by Oxbow under the Sanborn Creek Mine permit and has the capacity to produce 6 million tons per year of coal using longwall mining techniques.
- The Bowie No. 2 Mine is operated by Bowie Resources Ltd. and is presently conducting coal mining operations using longwall mining techniques. The mine produces about 5 million tons per year.
- The Sanborn Creek Mine is mined out, and as of February 2003, is in the process of being closed.

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- The West Elk Mine is operated by Mountain Coal Company and presently produces coal from several federal leases. Production from the West Elk Mine is slated to reach 8.2 million tons of coal per year in 2005. The mine is currently conducting coal mining operations using longwall mining techniques.
 - The Bowie No. 1 Mine is currently idle under provisions of temporary cessation approval from the CDMG. A total of 30 acres have been reclaimed; approximately 70 acres remain to be reclaimed.

Coal Explorations

Coal exploration has been initiated in the area in conjunction with actual coal mining operations. Such exploration activities have been undertaken to identify and delineate recoverable coal deposits. These activities generally involve drilling to delineate the coal reserves and evaluate coal quality. Exploration activities have occurred on GMUG National Forests and BLM-administered lands under plans of operation and subsequent amendments approved by the BLM and USFS. There also has been coal exploration on private lands. All exploration activities, whether on federal or private lands, must be permitted with the CDMG (see **Table 2-9**).

Utilities

The Western Area Power Administration owns and operates the Curecanti-Rifle 230/345-kilovolt (kV) electric transmission line that essentially parallels Terror Creek, west of the Bowie No. 2 Mine. A new spur road would be built from the transmission line ROW to the proposed Powerline well site. The ROW for this transmission line is 125 feet in width, including access roads. The transmission line structures are steel lattice with buried reinforced concrete bases.

The TDS Telecom telephone line is located near the proposed Leon Lake #5 well site. The structure is a single wooden pole with one strand of wire. The ROW for this line is 25 feet in width.

Timber Operations

The major timber harvest activities in the region have occurred in the Stevens Gulch area, which is located approximately 2 miles west of the Powerline and Bull Park well pad sites, within USFS-administered lands. Future timber sales are not being planned in this area. Very small timber sales may occur in the area of the remaining proposed well pad sites for the harvest of fence posts and fuel wood. These sales are generally very limited and scattered in nature. Further discussion of timber operations is given in Section 3.5.

Agricultural Activities

Agricultural activities have historically been, and continue to be, a prominent part of the local Paonia economy. Fruit production is generally confined to the valley floors and low mesas/terraces adjacent to the North Fork of the Gunnison River. The principal orchard crops are apples, pears, peaches, and cherries. In recent years, vineyards (and several wineries) have been developed and are being operated in the Paonia area.

Sheep and cattle grazing also occur on pastureland in the Paonia area, with summer livestock grazing occurring in the higher elevations within and adjacent to the lands in the proposed exploration area. Some pasturelands have been used for hay production. See Section 3.5 for further discussion on grazing in the project area.

3.8.1.2 Recreation

Dispersed Recreation

Dispersed outdoor recreation is the predominant type of recreation in the study area. The GMUG National Forests offer a wide variety of outdoor activities due to the varied terrain, spectacular scenery, and vast reaches of wilderness. The leading dispersed recreational activity is automobile travel for scenic enjoyment, which can be attributed to the exceptional scenery along established travel routes. Other popular outdoor recreational activities include hunting, fishing, hiking, camping, backpacking, horseback riding, mountain biking, cross-country skiing, snowmobiling, and ORV use.

The Grand Mesa Scenic and Historic Byway (SH 65) crosses the Grand Mesa on a 55-mile trip ranging from the orchards of the valley floor to the alpine meadows and lakes of its 11,000-foot summit. Access to fishing, camping, hiking, snowmobiling, ORV use, and skiing can be found along the Byway. The Byway is located approximately 4 miles southwest of the proposed Leon Lake #4 and #5 well pad sites.

The West Elk Loop Scenic Byway (SH 133 in the project vicinity) covers 205 miles, starting in Carbondale and looping through the communities of Paonia, Hotchkiss, Gunnison, and Crested Butte. The scenic loop travels through orchards and mountain passes and provides access to a wide range of recreational opportunities (e.g., hiking, fishing, camping, snowmobiling, and hunting). The Byway traverses south of the Proposed Action area, and at its closest is located approximately 1.25 miles south of the proposed Hawksnest well pad site.

The study area provides hunting opportunities for deer and elk. The CDOW manages the animals and sets the seasons, harvest limits, and regulations for hunting. Archery season for deer and elk extends from late August to the end of September. Muzzleloader season for deer and elk ranges from around September 13 to September 22. Hunting rifle season for deer ranges from mid-October to early November and mid-October to mid-November for elk. Hunting statistics compiled by the CDOW indicate that 676 deer (bucks) and 1,122 elk (439 bulls, 599 cows, and 84 calves) were harvested in the game management units overlapping the project area during the 2001 season.

The Green Mountain Trail passes north of Leon Lake #5, and joins and shares FR 127 west of Leon Lake #5, on the proposed access route to Leon Lake #4. The Green Mountain Trail receives use mostly from ATVs, horses, and mountain bikes. ATV and horse use on the Green Mountain Trail increases during hunting season. A separate foot trail passes approximately 180 feet southwest of Leon Lake #5 and connects to the Green Mountain Trail. This is a non-USFS system trail that sees minimal use. The Cedaredge Aqueduct trail passes north of Leon Lake #4. An administratively closed trail, one end of which is located on the southeast corner of Leon Lake #1 site, passes through the Leon Lake #4 site and connects to FR 127.

The Pilot Knob/Coal Gulch ATV Trail is a 4WD road located approximately 2 miles east of Somerset. The trail leaves SH 133 and runs north past the proposed Hawksnest and Thompson Creek well pad sites. The Coal Gulch/Pilot Knob is popular with local ATV groups and also is used by mountain cyclists. The trail had substantial maintenance performed in 2000 under grants received by a local ATV user group. Oxbow Mining also uses the trail for reclamation of a coal exploration hole and for coal lease monitoring purposes.

Two campgrounds, Twin Lakes and Weir Johnson, are located approximately 4 miles north of the proposed Leon Lake #4 and #5. Both are small, tent only, campgrounds that offer limited boating, fishing, and hiking opportunities.

One of the most popular snowmobile trails is the Sunlight-Powderhorn Trail System. The trail has 225 miles of maintained cross-country ski and snowmobile trails traveling from Powderhorn Ski Area on the Grand Mesa to Sunlight Ski Area outside Glenwood Springs. The Sunlight-Powderhorn Trail is located outside of the study area; however, Stevens Gulch Road (FR 701), which runs north of Paonia and passes the proposed Bull Park and Powerline well sites, is a popular access route to the trail. The Stevens Gulch Road also is a popular day use snowmobile route, and is used by cross-country skiers and snowshoers. In addition, the Stevens Gulch Road provides access to private land on the lower portions of the road and to private land parcels in Hubbard Park. This road also is a primary route to access the forest by recreationists and hunters.

One hunting outfitter/guide operates in the area of the Leon Lake #4 and 5 well sites. This operation uses an off-forest lodge but guides hunts in the area. Two outfitter/guides operate in the area where the Oakbrush and Hubbard Creek wells are proposed. The camps used are off-forest, and access to these wells would use the same routes as the guiding operations.

Developed Recreation

There are no developed recreation areas in the study area.

Recreation Opportunity Spectrum

The Recreation Opportunity Spectrum (ROS) is a system of describing a variety of forest settings provided on National Forest lands. There is no ROS system for lands managed by the BLM. Beyond the typical activities that visitors pursue on public lands, research has shown that the setting for these activities matters a lot to visitors. The ROS system offers managers a tool for managing landscapes to effectively provide a range of recreation settings for visitors to experience. There are six major setting categories within the ROS system. These are: Urban (U), Rural, Roaded Natural (RN), Semi-Primitive Motorized (SPM), Semi-Primitive Non-Motorized, and Primitive (P). As the names imply, they range from very developed (U) to very rustic and remote (P). In the project area, the proposed Powerline, Bull Park, and Leon Lake #5 well pad sites are located in the RN setting and the proposed Oakbrush, Hubbard Creek, and Leon Lake #4 well pad sites are located in the SPM setting. RN is defined as "paved or gravel all-weather roads, moderate number of encounters, moderate management presence, rustic facilities, moderate to high degree of 'naturalness'." SPM is defined as "primitive roads and trails, low number of encounters with other people, subtle and limited management presence, rustic facilities constructed of native materials, high degree of

'naturalness' with infrequent evidence of human activity" (USFS 1999). The proposed Thompson Creek and Hawksnest well pad sites are located on BLM lands; therefore, they do not fall within any of the above-listed setting categories.

Areas which are managed under the different ROS classes can absorb only as much impact from oil and gas exploration and development or other management activities as is compatible with the corresponding recreation opportunities available in these areas. In RN areas, controlled access roads and full access roads are compatible. Management activities may be visible to observers and the management activities at times may even dominate the landscape, but the line, form, color, and texture created must blend with the surrounding landscape character. In SPM areas, access is by primitive and controlled access roads. Management activities must blend with the surrounding landscape. They may, on occasion, dominate the landscape, but should blend with the line, form, color, and texture of the surrounding landscape.

3.8.2 Environmental Consequences

3.8.2.1 Proposed Action

Land Use

Impacts Applicable to All Sites.

Proposed Action. In the long term, following the completion of exploration and possible well development, the area would be used much as it was before exploration. The reclamation and revegetation techniques to be undertaken on any disturbed sites are comparatively simplistic, commonly accepted techniques with a history of successful application in the western states. Reclamation would be initially employed to provide for site stability, with revegetation allowing the disturbed sites to return to conditions that existed prior to any disturbance.

Reclamation of any surface disturbance would be planned to reestablish wildlife habitat and livestock grazing. Past experience in the area has shown that exploration activities have affected grazing management. When exploration activities occur, the vehicle traffic can have a negative impact on livestock management. The traffic can cause cattle to move out of an area, and the noise, dust, and commotion can cause cattle to move away. This is a short-term impact and is considered minor, since the exploration areas are limited in size.

The proposed project would be consistent and compatible with the existing multiple land uses in the project area, including historic and ongoing mineral exploration and development. Also, as discussed in Section 1.5, the proposed project would be consistent with the GMUG Forest Plan and the Uncompahgre Basin RMP.

Site-specific Impacts.

The following impacts are specific to particular well sites or their associated new road spurs:

Powerline. The WAPA Curecanti-Rifle 230/345 kV electric transmission line runs north from Paonia and crosses, and at times parallels, Stevens Gulch Road (FR 701). Access to the proposed Powerline well site would be via a new road spur off of the transmission line ROW. WAPA crews who use the ROW for regular maintenance activities would encounter temporary and minimal increases in project-related truck traffic, along with temporary delays during road improvements and construction activities. In addition, increased traffic also would occur on FR 701 for the Stevens Gulch #1 exploratory gas drilling site.

Recreation

Impacts Applicable to All Sites.

Dispersed Recreation. The development of the proposed project could reduce opportunities for dispersed recreationalists during the well drilling and construction of pads and new spur access roads. The displacement of dispersed recreationalists would be minimal because of the abundance of public, open-space lands available for dispersed recreational opportunities. Additionally, public access would be maintained within and around the project area (see Section 3.12 for an expanded discussion of roads). Although no specific recreational use data for public lands directly affected by the proposed project are available, effects to recreational activities would be seasonally dependant, the number of dispersed recreationalists affected is expected to be minimal, and their displacement would not create overuse of other areas or degradation of the resources.

There would be potential for siting a well pad close enough to a dispersed recreation site that the recreational experience and setting at the site would be degraded due to potential noise and visual effects. However, the impact would be temporary. Reclamation would be completed on all disturbed areas (including newly constructed spur roads) to comply with the USFS and BLM requirements. The long-term goal of reclamation would be to return the disturbed land to conditions approximating those that existed prior to disturbance.

Based on Geographic Information System (GIS) visibility analyses, none of the proposed exploration well sites or spur roads would be visible from the West Elk Loop Scenic Byway. As a result, there would be no project-related visual impacts to the scenic experience along this Byway.

There would be the potential for the propose project to effect the naturalness of the Grand Mesa. However, as stated above, potential noise and visual impacts would be temporary. Also, the number of well pad sites and associated disturbance is extremely small in comparison to the vastness of the Grand Mesa.

Site-specific Impacts.

The following impacts are specific to particular well sites or their associated new road spurs:

Bull Park and Powerline. Construction vehicles traveling to the Bull Park and Powerline well sites could affect access to the Sunlight-Powderhorn Trail System via Stevens Gulch Road (FR 701). However, GEC would prohibit construction truck travel during winter road closures and any well testing or monitoring at either well site would be conducted with the use of over-the-snow conveyance. Therefore, snowmobile

access to the Sunlight-Powderhorn Trail via Stevens Gulch Road would not be affected by well pad construction traffic.

Drilling activities at the Bull Park and Powerline sites could affect hunting in the area. Based on on-going hunter patrols in this area, the USFS has knowledge some hunters are extremely tied to specific hunting camps and sites. Increased traffic, noise, and human activity could displace hunters or cause them to leave the area altogether.

Hawksnest and Thompson Creek. The Pilot Knob/Coal Gulch ATV Trail leaves SH 133 approximately 2 miles east of Somerset and travels north past the proposed Hawksnest and Thompson Creek well sites. Construction traffic along this road could limit ATV recreation during the summer and fall. However, the existing Pilot Knob/Coal Gulch ATV Trail would be rerouted around the west side of the Thompson Creek well site until it can be returned to its original location. This could result in 0.09 acre of additional disturbance. Typically, no impacts to ATV use along the Pilot Knob/Coal Gulch ATV Trail would be anticipated. However, this ATV trail is used heavily during hunting season, and user conflicts are likely even with a trail reroute.

Leon Lake #4 and #5. ATV use along the portion of the Green Mountain Trail aligned with FR 127 would be affected by increased truck traffic associated with well drilling and completion. The foot trail that passes southwest of the Leon Lake #5 location would not be directly affected during construction of the well pad or spur road. Since the use of this trail is low, minimal impacts to recreationists are expected. The administratively closed trail connecting the Cedaredge Aqueduct Trail to FR 127 would be impassable at the Leon Lake #4 site. This could create a safety hazard for recreationists. This trail has been closed to public use, and is open to administrative uses for water commissioners and special use permittees. Although the trail has been “closed”, no physical devices have been placed to limit public use. Placement of closure devices such as gates on the newly constructed spur road would alleviate this conflict.

The Grand Mesa Scenic and Historic Byway travels north out of Cedaredge for approximately 7 miles before it curves west and north into the Grand Mesa National Forest. At its closest point, the Grand Mesa Scenic and Historic Byway is located within 4 miles of the proposed Leon Lake #4 and #5 well pad sites. Visual impacts to the scenic experience along the Byway could occur; however, GIS visibility analyses resulted in a finding of no visibility with regard to the Grand Mesa Scenic and Historic Byway to the north beyond the valley floor near Cedaredge.

Some reductions to hunting opportunities in the project area would occur from construction of the well pads. Potential conflicts could occur especially around Leon Lake #4 and #5. Noise and traffic associated with construction activities may disperse or move hunters and big game from the area. Some hunters are extremely tied to specific hunting camps and sites. Increased traffic, noise, and human activity could displace hunters or cause them to leave the area altogether. This impact would be temporary and no long-term impacts would occur. Given the diversity of public lands available for hunting throughout the region, this impact would not be considered adverse.

Oakbrush and Hubbard Creek. Project-related road use and drilling activities could affect the outfitter guides operating in the area. Increased traffic and noise could cause big game to disperse from the area; therefore, reducing the hunting success and experience.

Developed Recreation. There are no developed recreation areas within the study area.

Recreation Opportunity Spectrum. USFS lands support a variety of developed and dispersed recreation facilities and activities. ROS classes are delineated and mapped to identify classes of outdoor recreation environments. Based on the ROS classifications, the appropriate level of access, remoteness, naturalness, facilities and site management, social encounters, visitor impacts, and visitor management can be determined according to set criteria. The ROS classification for the project area is delineated as SPM and RN.

Over 1.25 million acres of the SPM ROS exists on the GMUG. These areas are characterized by a predominately natural or natural-appearing environment of moderate-to-large size, where motorized use is permitted. The area is managed in such a way that minimum onsite controls and restrictions may be present, but subtle. The GMUG National Forests contain over 600,000 acres of the RN ROS, where there are paved or gravel all-weather roads and evidence of the sights and sounds of humans is moderate. Based on proposed activities, access and intrusion of motorized use, the standard of developments (new spur roads, in particular), and the distance from access (e.g., SH 133), the project would not alter the existing ROS classification in the analysis area.

Currently, the BLM has no ROS system for classifying forest settings for lands under their jurisdiction. The Thompson Creek and Hawksnest well pad sites are located on BLM land; therefore, no setting categories exist for these two sites. However, if the USFS ROS system were applied to these two sites, based on their close proximity to SH 133 and access and intrusion of motorized recreation, their classification would potentially fall under the SPM setting. Under the SPM classification, the proposed project would not alter the existing recreational and activity setting in the area of these two well pad sites.

3.8.2.2 No Action

Under the No Action Alternative, the project area would remain the same and support the current land uses and recreation opportunities.

3.8.3 Cumulative Impacts

The principal past, present, and future actions with the potential for cumulative land use impacts include gas exploration, continued coal exploration and mining, timber sales, road and other construction projects, agriculture, and wildfire. Gas exploration, mining, grazing and other agricultural activities, and recreation would remain the dominant land uses in the immediate area of the proposed gas exploration project.

The potential cumulative impacts generally would be applicable to the eight proposed exploratory gas well sites. Based on the information presented in **Table 2-9**, which describes the nature, location, and timing of these actions, the following well sites could contribute to site-specific cumulative land use and recreation

impacts. These cumulative impacts could include effects to grazing management, reduced opportunity for dispersed recreation (including hunting), and effects to the recreational experience. These impacts would be temporary and could last a few months (during construction and completion) up to a few years (through testing, reclamation, and re-establishment of vegetation) in duration.

- Leon Lake #4 and #5 – Site abandonment at the Leon Lake #1 gas well and recompletion at the Leon Lake #2 gas well could result in cumulative impacts with Leon Lake #4. Potential GEC exploratory wells at Lone Pine #1 and Spaulding Peak, and the existing TDS Telecom phone line could result in temporary cumulative recreation impacts (particularly during hunting season) at both of these well sites.
- Powerline – Stevens Gulch road construction (for the Hubbard timber sale), timber clearing for the Stevens Gulch personal use area and the Rifle-Curecanti powerline, and Alder Creek coal exploration could result in temporary cumulative recreation impacts, particularly during hunting season.
- Bull Park – Based on the locations of the Stevens Gulch and Coal Gulch road improvements and depending on the timing of these construction activities, a temporary cumulative recreation impact could occur in association with surface disturbance for these roads. Timber management activities, including Terror Creek, Green Oak, and East Terror; road use and surface disturbance associated with the Alder Creek exploratory wells and access roads; and surface disturbance for the Rifle-Curecanti powerline and Pitkin Mesa pipeline could result in temporary cumulative recreation impacts, particularly during hunting season.
- Hawksnest and Thompson Creek – Construction of Coal Gulch road improvements, disturbance from the Hawksnest and Sanborn mines, and authorized coal exploration activities could result in temporary cumulative recreation impacts, particularly during hunting season.

The proposed project would contribute a very minor temporary incremental effect on existing land use and recreation in the cumulative effects area.

3.8.4 Potential Mitigation Measures

Additional protection measures for livestock management would be provided by coordinating with the USFS, as discussed in Section 3.5.2, Mitigation Measure V-3 and V-4.

The following additional mitigation would be implemented to reduce impacts on hunting:

R-1: To avoid conflicts with hunter use in the Leon Lake #4 and #5 area, Bull Park and Powerline areas, and Thompson Creek and Hawksnest areas, restrict drilling activities during hunting seasons.

R-2: To reduce impacts of drilling site construction on the Coal Gulch/Pilot Knob ATV trail, reroute the trail around the drill location.

R-3: To reduce conflicts with ATV users and promote safety, gate the access roads and trails to Leon Lake #4 at FR 127 and at the intersection with the Cedaredge Aqueduct ATV trail. Gates would be approved by the USFS.

3.9 Noise

3.9.1 Affected Environment

The study area for potential direct noise effects encompasses an area approximately 0.5 mile from the well pad sites and access roads. The study area includes communities along SH 133 (Paonia and Somerset) and SH 65 (Cedaredge) as part of the access route. The study area applies to both the Proposed Action and cumulative effects areas.

Background noise in the study area is indicative of a rural setting with occasional noise produced by local traffic. Background daytime noise measurements taken in the Paonia area and adjacent to SH 133 were 36 dBA and 41 to 49 dBA, respectively (BLM and USFS 2000). Routine local traffic in the Paonia area increased the noise levels to 48 to 56 dBA.

Noise-sensitive receptors in the study area vary depending upon the project component. Wildlife represent the primary noise receptors in the vicinity of the well sites and new road spurs. The effect of noise on wildlife is discussed in Section 3.6. Two residences in the Leon Lake area are located within 2 miles of well pad sites. One residence is located approximately 0.8 mile from Leon Lake #5 and 1.4 miles from Leon Lake #4. The other residence is situated approximately 1.2 miles from Leon Lake #5 and 2 miles from Leon Lake #4. No other residences are located within 5 miles of the well sites. Noise receptors along the major access routes include the communities of Paonia, Somerset, Cory, Orchard City, Eckert, and Cedaredge. Scattered residences are located along SHs 133 and 65.

3.9.2 Environmental Consequences

3.9.2.1 Proposed Action

Impacts Applicable to All Sites

Noise would be generated by vehicles and equipment during access road and well pad construction, light and heavy truck traffic along access roads, well drilling operations, and reclamation activities. The noise level for receptors (i.e., wildlife, people using roads and trails, and residences) would depend upon the distance to the receptor, screening effects from terrain and vegetation, wind speed, and other localized climate factors (BLM 1992).

The federal standard for noise at residences or other noise-sensitive receptors (e.g., big game and other wildlife) is 55 dBA at a distance of 25 feet from the noise source. Temporary low to moderate noise levels would be produced during construction due to traffic and equipment operation. Temporary traffic-related noise also would occur along the access roads. Noise could increase to levels between 40 and 65 dBA. The duration of noise effects would vary depending upon the activity. Truck traffic would produce increased noise for several minutes as vehicles pass a particular point. Drilling and completion noise would continue for about 8 days for each activity. The duration of well testing could vary from several days to several months. The closest residences would be along SH 65 and SH 133 near Somerset. Temporary increased noise levels would result from drilling rigs and other heavy equipment. By using engines with mufflers,

drilling and completion operations would produce noise levels below 55 dBA at approximately 500 feet from the source (BLM 1992). Ground-level gas flare noise would be less than 40 to 50 dBA at a distance of 1,000 feet from the well site (Hoover and Keith Acoustical Consultants 2002). Since construction and drilling operations would not occur within 1,000 feet of residences, noise levels are expected to be below the 55 dBA standard. Noise impacts on wildlife are discussed in Section 3.6.2.

Site-specific Impacts

The following impacts are specific to particular well sites and their new road spurs.

Leon Lake #4 Site. Temporary increased noise would occur along SH 65, CR U50, 2500 DR, FR 125, FR 127, and the new spur road due to truck traffic. An average of 25 trucks per day would occur over a 28-day period. The closest residences to the access routes are scattered along SH 65 between Cory and north of Cedaredge, where houses are located within 100 to 200 feet of the highway. The highest density of residences is found in the Cedaredge area. Noise effects from construction, drilling, and completion mainly would affect wildlife near the well pad site during a 28-day period. Noise would be below the 55 dBA standard for residences, since the closest house is 1.4 miles from the well pad site. Noise effects from testing would be minor during a 5- to 150-day period (potentially 1 to 3 years) due to low traffic numbers (i.e., 2 roundtrip light-duty truck trips per day per well).

Leon Lake #5 Site. Noise effects from vehicle traffic, construction, drilling, completion, and testing would be the same as discussed for the Leon Lake #4 well site. Sequencing of completion and drilling would result in separate schedules rather than an overlap or subsequent timing for Leon Lake #4 and #5 during a 28-day period for each well site (**Figure 2-10**). Noise would be below the 55 dBA standard for residences, since the closest house is 0.8 mile from the well pad site.

Bull Park and Powerline sites. Temporary traffic-related noise would occur along SH 133, CR 40.10, FR 701, and the new road spurs. The closest residences occur along the lower portion of FR 701. Houses in the Paonia area are greater than 1,000 feet from SH 133. Noise effects from construction, drilling, completion, and testing mainly would affect wildlife near the well pad site. Noise would be below the 55 dBA standard for residences, since none are located within 2 miles of the well pad sites. Sequencing of completion and drilling would result in separate schedules rather than an overlap or subsequent timing for these two well sites (**Figure 2-10**).

Hubbard Creek and Oakbrush sites. Temporary noise levels would increase along the access routes consisting of SH 133, Bear Creek Road, and the new road spurs during a 28-day period for each well site. The closest residences to the access routes occur along SH 133 near Paonia. Only one seasonal residence, a hunting camp, occurs adjacent to Bear Creek Road. Noise effects from construction, drilling, completion, and testing mainly would affect wildlife near the well pad site. Noise would be below the 55 dBA standard for residences, since none are located within 2 miles of the well pad sites.

Hawksnest and Thompson Creek sites. Temporary noise levels would increase along the access routes consisting of SH 133, Coal Gulch Jeep Trail, and the new road spurs. Sequencing the construction, drilling, and completion at these two sites back-to-back would extend the period to approximately 56 days. The

closest residences to the access routes occur along SH 133 near Somerset, where houses are located within 100 feet of the highway. Only one residence occurs adjacent to the lower portion of Coal Gulch Jeep Trail. Noise effects from construction, drilling, completion, and testing mainly would affect wildlife near the well pad site. Noise would be below the 55 dBA standard for residences, since none are located within 2 miles of the well pad sites.

3.9.2.2 No Action

Under the No Action Alternative, no construction, drilling, or traffic-related noise would occur in the study area. Current noise levels would continue in the area.

3.9.3 Cumulative Impacts

The principal past, present, and future actions with the potential for cumulative noise impacts include gas exploration; continued coal mining; timber sales; road and other construction projects; and the proposed GEC exploratory wells at Spaulding Peak #1, Lone Pine #1, and Stevens Gulch #1. GEC's proposed project would not add incremental noise impacts to other potential cumulative actions that affect noise levels in the vicinity of the well pad sites and their associated access roads due to the temporary and localized nature of project noise impacts.

Truck traffic along the access roads to the GEC well sites would add temporary noise increases to other cumulative activities during the period 2003 through 2006. Most of the increased traffic for cumulative actions would occur along SH 133, SH 65, FR 125, and FR 701. However, noise effects mainly would affect wildlife. Estimated noise levels from cumulative traffic-related noise are expected to be below the 55 dBA standard for residences.

No unique or specific cumulative noise impacts were identified for individual well sites.

3.9.4 Potential Mitigation Measures

No additional mitigation measures are required for noise.

3.10 Visual Resources

3.10.1 Affected Environment

The Proposed Action and cumulative effects study areas for visual resources include the viewsheds potentially affected by the well pad sites and new road spurs for the proposed Leon Lake #4, Leon Lake #5, Powerline, Bull Park, Hubbard Creek, Oakbrush activities on USFS land, and the Hawksnest and Thompson Creek activities on BLM land.

A goal of both the USFS Forest Plans and BLM RMPs is to maintain, protect, and, if possible, enhance aesthetic values. The BLM and USFS use a VRM System and visual quality objectives (VQOs), respectively, for visual resources. The definitions of USFS and BLM visual objectives are provided in **Table 3.10-1**.

Table 3.10-1
Summary of Visual Resource Management Objectives

VRM Objectives	Definition
Class I	The objective of this class is to preserve the existing character of the landscape. This class provides for natural ecological changes; however, it does not preclude very limited management activity. The level of change to the characteristic landscape should be very low and must not attract attention.
Class II	The objective of this class is to retain the existing character of the landscape. The level of change to the characteristic landscape should be low. Management activities may be seen, but should not attract the attention of the casual observer. Any changes must repeat the basic elements of form, line, color, and texture found in the predominant natural features of the characteristic landscape.
Class III	The objective of this class is to partially retain the existing character of the landscape. The level of change to the characteristic landscape should be moderate. Management activities may attract attention but should not dominate the view of the casual observer. Changes should repeat the basic elements found in the predominant natural features of the characteristic landscape.
Class IV	The objective of this class is to provide for management activities, which require major modifications of the existing character of the landscape. The level of change to the characteristic landscape can be high. These management activities may dominate the view and be the major focus of viewer attention. However, every attempt should be made to minimize the impact of these activities through careful location, minimal disturbance, and repeating the basic elements.

Source: BLM 1975.

3.10.1.1 Study Approach

The USFS has assigned a VQO of Modification to applicable lands in the project area.

The BLM conducted regional analysis and mapping in 1979. Maps no longer are available; however, the BLM has assigned a VRM Class II objective to the North Fork of the Gunnison watershed. A site-specific

viewshed analysis of the Hawksnest and Thompson Creek areas resulted in a revision of the original VRM Class II designation to VRM Class III. This objective is consistent with the USFS VQO of Modification.

3.10.1.2 Study Area

The study area is generally north-northeast of the towns of Cedaredge, Paonia, and Somerset in Delta and Gunnison counties. Residents and visitors frequent the area for its scenic and recreation values. The Grand Mesa Scenic and Historic Byway is located approximately 4 miles southwest of the Leon Lake #4 and #5 well pad and access road areas. The West Elk Loop Scenic Byway is located approximately 1.25 miles south of the proposed Hawksnest site.

Physiography of the study area is defined by unit 21b, the Uinta Basin of the Intermontane Colorado Plateaus. The study area is a short distance from the boundaries of two other provinces: unit 21c, the Canyonlands section of the Intermontane Plateaus; and unit 16 of the Southern Rocky Mountains.

3.10.1.3 Landscape Character

Landscape character definitions express the visual image of a geographic area and consist of the combination of physical, biological, and cultural attributes that make each landscape identifiable or unique. Landscape character embodies distinct landscape attributes that exist throughout an area. Landscape patterns in the area are generally natural appearing with interspersed USFS roads and minerals exploration and extraction activities. Evidence of management activities are subtle in this area. Tree cover patterns help to hide cultural activities such as roads, mining, vegetation management, mineral exploration/extraction, vehicle access/movement. This combination of rock, water, and trees captures the aesthetic qualities that make the region a popular place for enjoyment of scenery.

Seven vegetation communities (aspen, Douglas fir, meadow, mountain shrub, oakbrush, piñon-juniper, and spruce/fir) define the landscape character within the immediate viewsheds of the well sites, new road spurs, and access roads from SH 133. Dominant species associated with these vegetation communities are described in Section 3.5. Visual characteristics of the well sites are described below.

- Leon Lake #4 (USFS) – The characteristic landscape of the Leon Lake #4 site is that of meadow surrounded by aspen and meadow vegetation with flat to moderately sloping topography. The characteristic landscape of the access road is that of mountain shrub and meadow vegetation with moderately sloping topography.
- Leon Lake #5 (USFS) – The characteristic landscape of the Leon Lake #5 site is that of a logged, clearing in the aspen and immature aspen surrounded by mature aspen and meadow vegetation with flat to moderately sloping topography. The characteristic landscape of the access road is that of immature aspen vegetation with moderate to steeply sloping topography.
- Bull Park (USFS) – The characteristic landscape of the Bull Park site and access road is that of mature aspen trees with flat to moderately sloping topography.

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- Powerline (USFS) – The characteristic landscape of the Powerline site and access road is that of mature aspen vegetation with flat to moderately sloping topography.
 - Hubbard Creek (USFS) – The characteristic landscape of the Hubbard Creek site and access road is that of mature aspen and oakbrush vegetation with moderate to steeply sloping topography
 - Oakbrush (USFS) – The characteristic landscape of the Hawksnest site and access road is that of oakbrush and meadow vegetation with flat to moderately sloping topography.
 - Hawksnest (BLM) - The characteristic landscape of the Hawksnest site and access road is that of oakbrush and meadow vegetation with flat to moderately sloping topography.
 - Thompson Creek (BLM) - The characteristic landscape of the Thompson Creek site and access road is that of oakbrush vegetation with moderate to steeply sloping topography. There are mature aspen within the viewshed. During the spring and fall, the aspens present a flush of color that dominates the landscape.

3.10.1.4 Seen Area/Sensitivity

Portions of the landscapes visible from travelways may be important to constituents for their scenic quality, aesthetic values, and landscape merits. Travelways that lead to important scenic features, recreation areas, unique natural phenomena, and trailheads attract higher percentage of users having high concern for scenic quality.

The Grand Mesa Scenic and Historic Byway is a Sensitivity Level 1 Travelway. It is approximately 4 miles from the nearest proposed well pad site and access roads (Leon Lake #5). As such, these sites and all others are classified as a “background” viewing distance from the Grand Mesa Scenic and Historic Byway. The sites are not directly visible from the Grand Mesa Scenic and Historic Byway. The West Elk Loop Scenic Byway also is a Sensitivity Level 1 Travelway. It is approximately 1.25 miles from the nearest proposed well pad site and access road (Hawksnest). This site, and all other sites, would not be directly visible from this Byway. The remaining USFS roads are secondary travelways and low use areas. Visibility of the sites and access roads from the USFS and BLM roads ranges from invisible, to limited visibility, to highly visible, based upon heights and distances of intervening vegetation and topography. The visual landscape of the proposed well pad sites and access roads is typically in the “immediate” foreground (0 to 300 feet) and “foreground” (0 to 0.5 mile) view distances.

3.10.2 Environmental Consequences

3.10.2.1 Proposed Action

Impacts Applicable to All Sites

Portions of the existing vegetative cover would be removed and land leveling would occur for construction and utilization of the access roads and well pads. There would be loss of vegetative screening, but the view from the USFS and BLM roads would be limited by intervening landforms, shrubs, and trees. The screening effects of trees would diminish during the late fall, winter, and early spring seasons. The well pads and access roads would be most evident from superior viewing positions (i.e., viewers situated at elevations higher than the project study area) and less evident to invisible from inferior viewing positions (i.e., viewers situated at elevations lower than the project study area). **Table 3.10-2** shows estimated acreages with regard to future visibility for two scenarios as follows: 1) visibility of each pad's earthwork surface from all potential viewer locations (total viewshed) throughout the region; and 2) visibility of facilities 90 feet above the ground (the drilling completion rig, at 90 to 95 feet, is the tallest structure) at each well site from all potential viewer locations (total viewshed) throughout the region. The total viewshed is approximately 448,750 acres, the area of ten USGS quadrangles. The majority of visibility acreage occurs in the middle ground and background viewing situations.

Table 3.10-2
Estimated Area of Visibility of the Well Pads and Drilling Rig¹

Well Site	Visibility (acres)			
	Ground Surface	Percent	90 Foot Height	Percent
Bull Park	16,215	3.6	22,147	4.9
Hawksnest	9,816	2.1	18,082	4.0
Hubbard Creek	12,303	2.7	16,335	3.6
Leon Lake #4	9,147	2.0	12,513	2.7
Leon Lake #5	4,740	1.1	11,018	2.4
Oakbrush	15,942	3.5	20,569	4.5
Powerline	19,459	4.3	31,114	6.9
Thompson Creek	7,562	1.6	16,654	3.7
Total Visible Area	60,838	13.5	81,031	18.0

¹Total viewshed acreage = 448,750.

Generally, project visibility is contained within the upper plateau area, and visibility from sensitive receptors in the immediate foreground and foreground would be limited. However, in the case of the Leon Lake #4 and #5 sites, visibility extends to the southwest to the valley floor (including the town of Cedaredge). The Bull Park, Powerline, and Thompson Creek sites would be seen by observers situated on the intermediate ridges and mountains to the south, east, and northeast beyond the North Fork of the Gunnison River.